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AND

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THE NEW CITY.

The inhabitants of southern latitudes, almost uniformly build their cities with narrow streets. Even some of the most splendid palaces in Rome, are situated in streets of twenty or thirty, and even a less number of feet in breadth. But the glory of these palaces is the interiour. You pass from the dark and narrow alley through a magnificent archway, guarded night and day by a porter, and having thus penetrated through and under the front of the building, you find yourself in a spacious open square, surrounded on all sides by the palace, and unprotected, by any roof, from the atmosphere. This spacious square, which is called the court, is generally large enough to admit of a carriage road all around it, next the building, and to leave in the centre, either an inclosure or an open area, adorned either with trees, shrubs and flowers, as a garden, or ornamented with marble pavements and fountains. Within this court, in the surrounding buildings, dwell either one or more families, according to their opulence or poverty; and the square itself furnishes all the light and air which, in this country, we derive from our streets; excepting, that both are generally furnished in a larger and more wholesome quantity in the former. In cities where this style of domestick architecture prevails, it is obvious that streets become of comparatively minor importance, as affording situations for dwelling houses, since every dwelling house is well or ill situated, according to its court. Those whose windows look into a court of only eighty or one hundred feet in breadth, must of course enjoy a much more confined circulation of air, than those whose magnificence enables them to surround three or four hundred feet square with their splendid terraces.

In these cities there is generally a street for retailers, which sometimes expands into about the width of from twenty to thirty feet. The remaining streets are used as gutters; as places fit to throw filth upon from the windows; and as places through which people must pass, to go from one court to another.

The disadvantages of this system are not so great as we should at first presume. It has been of immemorial custom, and originated in those fearful times, when even in cities, it was well for every man to make his house his castle, and to be able to endure a siege of some weeks or months, without being confined to mere walls, and without losing the delight of the open air. These courts too, constitute circles of attraction for numerous families who are allied either by kindred or acquaintance, and with whom it is a valuable object, both for themselves and their children, to institute a good and pleasant neighbourhood aloof from the great world abroad.

It should be recollected also that what would constitute one great objection in our climate to this style of domestick architecture, hardly exists at all in the climates where it is in familiar use. I mean the danger of fire.—This it will be recollected is very inconsiderable in countries where the great object, for ten months in the year, is to alleviate the oppressive heat. The narrow streets are admirable preventives against heat. It is a difficult thing for the sun to find its way through the deep and narrow ravines of masonry to the ground. Consequently its action upon animal and vegetable substances is obviated, and the inhabitants can move about in the shade as cooly as in a cellar. Neither is there any snow. For if they had that to contend with they would be obliged to widen their street, or must remain blockaded the year through.

It appears to us that there is every reason to desire broad streets in a cold climate, that there is to prefer narrow streets in a hot one; and it is our object particularly to draw publick attention to this subject in our own city, where we think our streets are a great deal too narrow; and where we are about inflicting upon our posterity, by laying out new streets of inadequate breadth,

much greater inconvenience than even our ancestors have unwittingly left upon us.

We refer particularly to the south-west part of the city, which is commonly called the Neck Lands. In our remarks we intend to allude to all the land which lies to the north and west of Charles street, Pleasant street, and Washington street, until we pass the Boston boundary and come to Roxbury meeting-house towards the south-west, and the Boston and Roxbury mill corporation rights on the north-west. We have considered this subject long and maturely; independently and comparatively; and we have arrived at the following conclusions:

1. The land above mentioned, is capable of being made the most beautiful city in the United States, if not in the world.

2. It can be so made, without taxing the inhabitants of this city a cent.

3. It will, if so made, yield this city a revenue which will keep down the interest, and finally will extinguish the city debt.

We know very well that this subject is in good hands; that the present agent of the city, for the disposal of neck lands, will do all that any man can do under the present system. But we call upon our fellow citizens to survey the golden field before them; to review, revise, and alter their old system; and bring under one general plan, and into immediate proximity, the riches and resources of their city.

Some years since, a plan for uniformly laying out the southerly part of the city, (which we here beg leave to denominate the *New City*, a name by which it ought, and we hope will be called, and be soon well known,) was presented, by one of our fellow citizens, to the late mayor. As the plan was intended solely for publick good, the author desired, and still hopes to reserve his name from publication. This plan, in addition to the new city, projected so many alterations in the old city, and was presented at a time when publick enterprize received such a check from the falling off of trade, that it has remained unnoticed ever since. We shall proceed however, to recount, as nearly as we can recollect, its object respecting the new city. Remarking only, that the plan we refer to, was not exhibited as an accurate survey, but merely as a design. The draftsman projected his streets of, what we call in Boston, a vast breadth; one hundred feet. The corporation of New-York have laid out all their new avenues of this breadth, to the number of thirteen; and in Washington, some of the streets are one hundred and eighty feet broad; and we believe, Oxford street, London, is at least two hundred feet broad. In a street, one hundred feet wide, it is hardly to be supposed, that, in the coldest night, and with the highest wind, fire could be suffered to communicate across. We therefore think that width sufficient. One hundred feet would afford for areas in front of each house, (to be used for steps, for a grass plot, or for a cellar-way, on each side,) six feet, ... 12
Fifteen feet on each side for side-walks, 30
Four feet on each side for trees, . . 8
Remainder for carriage-way, . . . 50

Whole street, . . Feet . . . 100

The draftsman had laid out the new city, by four or five of these streets running, as nearly as possible parallel to Washington street, and extending from Pleasant street to the road running by Roxbury meeting-house. This gave an average length of about two miles, being about the length of Broadway, New- York. These streets would all be on a dead level (which should be established by proper authority) until they arrived in Roxbury, where there would be a gradual rise. We now ask our readers to pause and contemplate the splendid scenes which the New City would present. Five or six parallel streets of one hundred feet in breadth, and in length nearly two miles, perfectly straight and entirely level until at one termination they were mingled in the heart of the city, and at the other overshadowed in the rich orchards of Roxbury!!

The draftsman had laid out these streets four or five hundred feet distant from each other, intending that the intervening space could be bisected by other streets of less magnitude than the splendid avenues we have attempted to describe. The eastern-most avenue, which would run nearest Washington street, was continued across Pleasant street, and joined what was called at that time Nassau street, now Tremont street, and the western-most avenue was intended as the border of the city, to be ornamented throughout its entire length, with one or two rows of trees forming a promenade directly upon the edge of the beautiful expanse of water to the west, and commanding the most charming prospect of the whole circle of delightful country from West-Cambridge hill, quite round to Roxbury. We cannot imagine a more beautiful place than this avenue, if laid out as projected. Those only who have either, by skaiting or

sailing, passed over the lines where it would fall, can form an adequate idea of the prospect it would command.

The space immediately west of the common is left vacant upon this plan, or rather is left open; and, to avoid expense, the draftsman projected only a dam to extend along from the last mentioned avenue to the present mill dam, which should include between it and the common, and Charles street, a full basin of salt water. The dam to the westward to be ornamented in the same manner as the western-most avenue, and indeed to be a continuation of the same. The idea of making a full basin upon these flats, immediately west of the common, we approve, both for the sake of beauty and economy; especially as the New City would be adequate to the accommodation of as many inhabitants as we can reasonably expect to have in this city for one hundred years to come; and therefore, that land could not be wanted for building lots.

We have described only the main avenues reaching from Boston to Roxbury. We proceed now to describe the cross avenues. These are all laid out at right angles. All run from Washington street to the water. All are at a uniform distance from each other. All are designed to be on a dead level; and are all one hundred feet wide. But to avoid the expense of paving, and at the same time to retain the advantages of broad streets, the draftsman has, in all the cross streets, appropriated twenty-five feet on each side next the houses to be used as a front yard; the remaining fifty feet in the centre to be used as side-walks and carriage way. And it is also designed that upon the exteriour lines of the front yards, there should be trees planted in each street in regular rows. In one street, elms; in another, oaks; in another, horse-chesnuts; in another, sycamores; so that each street should be named and known by the trees growing in it.

There are some places where the draftsman has proposed to leave certain open squares. And in one place where the curvity of Washington street leaves an ample space between the nearest avenues, he has laid out a circle of seven hundred feet in diameter, similar, in design, to the late splendid improvements in Regent street, London.

We do not say that much better plans than this, which we describe merely from recollection, cannot be adopted for this valuable portion of city property; but we give preference to it entirely before the miserable ginger-bread work which is presented to us in our city plans; and, indeed, we can conceive of nothing more splendid than Boston would be, were the plan we speak of, adopted.

The plan, commonly presented to us, cuts off by cross streets, the most southern, and by nature the most beautiful portion of the city. The plan we describe, approximates the whole territory by grand avenues leading directly to the heart, as it were, of the city.

We believe, at any rate, that the New City must be built in the course of time. All that we have to do now, is to say how it shall be built. Do not let us fear to "throw away," as it is miscalled, too much land for streets and squares. The whole territory is too large for our population, let it increase ever so fast. We can afford, therefore, to lay it out magnificently. We can afford to have there a city worthy of our history.

No city ever had so fine an opportunity to extend the greatest of improvements over its immediate neighbourhood. Lay out a good plan, and posterity will accomplish it.

We have done our task; we have called publick attention to this subject; now let the people act. We have only to remark that the New City is larger than the whole surface of Philadelphia, (exclusive of its suburbs,) which supports a population, two thirds inhabited, of seventy thousand souls. We beg our readers to pursue this subject by their valuable inquiries, and to unite in making strenuous exertions to add to the ornament and opulence of their native city, by bringing this dead property into notice, use, and improvement.

COMMUNICATION.] [FOR THE MAGAZINE.]

ROTATORY STEAM ENGINE.

Many fruitless attempts have been made to construct a steam engine, so as to produce a rotatory motion without the intervention of a crank, and other ponderous and complicated machinery; the difficulties in these are,

1. Not being able to keep the packing of the piston in good working order.

2. The piston, or movable part, on which the steam acts, travels with various velocities in different parts of it, in the same way as the spoke of a carriage wheel, the part nearest the hub travelling slower than the part nearest the rim; this is said to be a source of loss.

3. Not being able to cut off the steam so as to allow it to act expansively.

These constitute the objections to the Rotatory Engine, and may be found in Tredgold's work on the steam engine.

I have constructed a model of a Rotatory Engine which works well, and appears to be free from all the above objections, although it may have others as bad. I wish for the opinion of mechanicks on the subject.

In order to understand how this engine operates, we will suppose a wheel, having two of its opposite arms hollow, so as to communicate with each other through the hub, and within this hollow part a block of lead, or other ponderous body is made to slide by the action of steam, in the same way as in the common engine. If we suppose this sliding block or piston to be at the bottom of the wheel, and steam should be suffered to pass through the axis of the wheel, and along a branch pipe which enters the hollow arm just below the piston, the steam will press the piston upwards, until it arrives at the top of the wheel; if the piston is now directly over the centre of the wheel, (or in the line of direction,) the wheel will remain still; but if it be turned a little to the right or left, the weight of the piston will cause the wheel to revolve, until the piston reaches the bottom, when the steam is admitted through another passage in the axis, and along another branch pipe, which enters the hollow arm just below the piston in its present situation, being the opposite side of the wheel to that where the beforementioned branch pipe entered, the piston is again forced up to the top of the wheel. The action of this engine is similar to a tread-mill, the weight being always upon the descending side of the wheel; for as soon as the weight arrives near the bottom of the wheel, it is instantly thrown in a direct line to the top. The wheel serves to carry the piston beyond the line of direction, producing a uniform rotatory motion, the steam always enters at the bottom of the piston and escapes at the top. T. C.

N. B. It is obvious the same arrangement might be used for pumping water, merely by turning a crank; the descent of an heavy piston would form a vacuum at one end of the cylinder, while water would be forced out at the other.

In our next number we shall furnish an engraving of this engine. And we hope to enrich our future numbers with more communications from the same intelligent source.

Extract from Dr. Franklin's *Maritime Observations*, published in the second volume of the Transactions of the American Philosophical Society, page 300.

"I have been a reader of newspapers now near seventy years, and I think few years pass without an account of some vessel being met at sea, with no soul living on board, and so many feet water in her hold, which vessel has nevertheless been saved and brought into port; and when not met with at sea, such forsaken vessels have often come ashore on some coast. The crews who have taken to their boats, and thus abandoned such vessels, are sometimes met with and taken up at sea by other ships, sometimes reach a coast, and are sometimes never heard of. Those that give an account of quitting their vessels, generally say that she sprung a leak; that they pumped for some time; that the water continued to rise upon them; and that despairing to save her, they had quitted her lest they should go down with her. It seems by the event, that this fear was not always well founded, and I have endeavoured to guess at the reason of the people's too hasty discouragement.

When a vessel springs a leak near her bottom, the water enters with all the force given by the weight of the column of water without, which force is in proportion to the difference of level between the water without and that within. It enters therefore with more force at first, and in greater quantity, than it can afterwards, when the water within is higher. The bottom of the vessel too is narrower, so that the same quantity of water coming into that narrow part, rises faster than when the space for it to flow in is larger. This helps to terrify. But as the quantity entering is less and less as the surfaces without and within become more nearly equal in height, the pumps that could not keep the water from rising at first, might afterwards be able to prevent its rising higher, and the people might have remained on board in safety, without hazarding themselves in an open boat on the wide ocean.

Besides the greater equality in the height of the two surfaces, there may sometimes be other causes that retard the farther sinking of a leaky vessel. The rising water within may arrive at quantities of light wooden work, empty chests, and particularly, empty water casks, which, if fixed so as not to float themselves, may help to sustain her. Many bodies which compose a ship's cargo, may, be specifically lighter

than water; all these, when out of water, are an additional weight to that of the ship, and she is in proportion pressed deeper into the water; but as soon as these bodies are immersed, they weigh no longer on the ship, but on the contrary, if fixed, they help to support her, in proportion as they are specifically lighter than the water. And it should be remembered, that the largest body of a ship may be so balanced in the water, that an ounce less or more of weight may leave her at the surface, or sink her to the bottom. There are also certain heavy cargoes, that when the water gets at them are continually dissolving, and thereby lightening the vessel, such as salt and sugar. And as to water casks mentioned above, since the quantity of them must be great in ships of war, where the number of men consume a great deal of water every day, if it had been made a constant rule to bung them up as fast as they were emptied, and to dispose the empty casks in proper situations, I am persuaded that many ships which have been sunk in engagements, or have gone down afterwards, might, with the unhappy people, have been saved; as well as many of those which in the last war foundered, and were never heard of. While on this topick of sinking, one cannot help recollecting the well known practice of the Chinese, to divide the hold of a great ship into a number of separate chambers, by partitions tight caulked, so that if a leak should spring in one of them, the others are not affected by it; and though that chamber should fill to a level with the sea, it would not be sufficient to sink the vessel. We have not imitated this practice. Some little disadvantage it might occasion in the stowage is perhaps one reason, though I think that might be more than compensated by an abatement in the insurance that would be reasonable, and by a higher price taken of passengers, who would rather prefer going in such a vessel. But our sea-faring people are brave, despise danger, and reject such precautions of safety, being cowards only in one sense, that of *fearing* to be *thought afraid.*

We make a further extract from the Scotch writer, referred to in our last number, whose essays are entitled the "Philosophy of a Future State," believing that while many may not coincide strictly in opinion with him, still, that all will be interested in the perusal of the article.

We hope that no one will take offence at our selections of this character. Many of our readers are found among the young; and while the conductors of the Magazine have a duty to perform to represent the sciences in their true character in their *present state*, they would fain lead the minds of their young patrons to the Divine Author of all science, and of every human art; an object which has not been deemed unworthy the regard of several of the learned lecturers at the Athenæum hall, in the conclusion of their discussions of the many interesting subjects which have there been presented.

The astonishing instances mentioned of genius in early life, or in fact almost before life may be said to have had an existence, except in lisping infancy, will remind many of our readers of the case in our own country, and in this city a few years since, which existed in the intuitive faculties of the boy COLBURN; and by the occular demonstration had of the facts in that case, no one, we presume, can doubt the truth of any of the circumstances below stated.

"The Creator himself has laid the foundation of the mathematical sciences. His works consist of globes and spheroids of all different dimensions, and of immense concentrick rings revolving with a rapid motion. These globes are carried round different centres, some of them in circles, some in ellipses, and others in long eccentrick curves. Being impelled in their courses by different degrees of velocity, their real motions cannot be traced, nor the beautiful simplicity and harmony of the different systems made apparent, without the application of mathematical investigations. To an observer, untutored in this science, many of the celestial motions would appear to display inextricable confusion, and lead him to conclude, that the Framer of the universe was deficient in wisdom and intelligent design.—The principles of mathematicks are also exhibited in the numerous and diversified figures into which diamonds, crystals, salts, and other bodies, are formed; in the hexagonal cells of bees, wasps and hornets; in the *polygons* and *parallel lines* which enter into the construction of a spider's web, and in many other objects in nature.—Now, since God has exhibited the elements of this science before us in his works; since he has endued us with rational faculties to

appreciate and apply these elements to useful investigations; and since his wisdom and intelligence, and the beauty and order of his works, cannot be fully understood without such investigations,—it is evident, that he must have intended, that men should be occasionally exercised in such studies; in order to perceive the depths of his wisdom, and the admirable simplicity and harmony of his diversified operations. And as the applications of this science are extremely limited in the present world, its more extensive applications, like those of many other branches of knowledge, must be considered as reserved for the life to come.—To suppose, therefore, that such studies will be abandoned, and such knowledge obliterated in a future state, would be to suppose, that the works of God will not be contemplated in that state, and that redeemed men in the heavenly world will lose a part of their rational faculties, and remain inferiour, in their acquirements, to the inhabitants of the earth, even in their present imperfect condition.

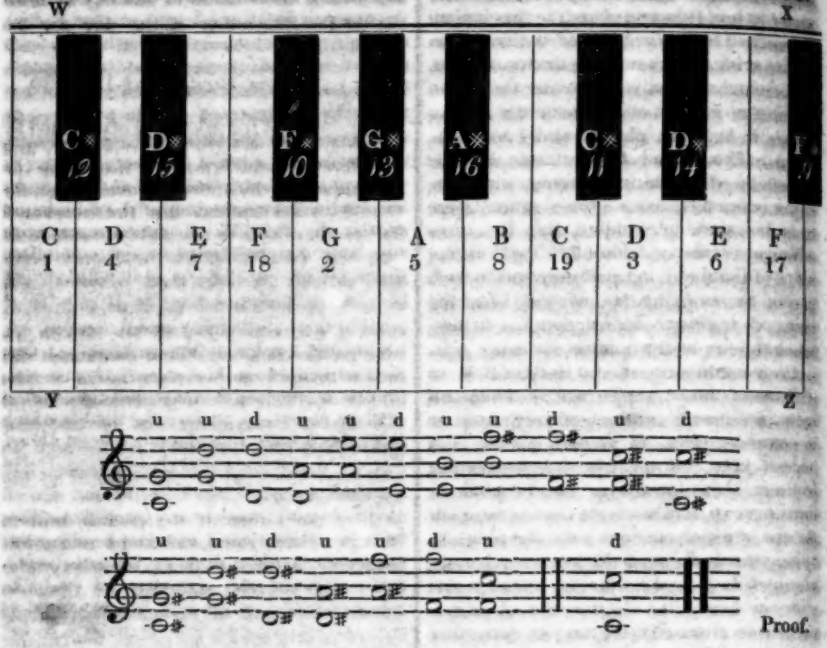
There are, indeed, several arts and sciences which more immediately respect the present world, and our relations in it, which cannot be supposed to be subjects of investigation in a future state of happy existence. The study of *languages*—which forms a prominent object of attention with many of those who declaim on the vanity of human science—the study of medicine as a practical art; the study of civil municipal law; the study of political economy, heraldry and fortification; the arts of war, farriery, falconry, hunting and fishing; the arts of the manufacturer, clothier, dyer, &c.—in short, all those arts and sciences which have their foundation in the moral state of our nature, will, of course, pass away, as exercises which were peculiar to the deranged state of our terrestrial habitation, and the condition of its inhabitants; and which, therefore, can have no place in a scene of moral perfection. But the principles of the mathematicks, and the axioms on which they are built, the truths of natural philosophy, astronomy, geography, mechanicks, and similar sciences, will be recognized, and form the basis of reasoning and of action, so long as we are sentient beings, and have a relation to the material system of the universe. Many truths, indeed, which now require much study, and long and intricate trains of reasoning before they can be acquired, may be perceived by simple intuition, or, at least, be more easily and rapidly apprehended than at present. If a genius like that of Sir Isaac Newton, could perceive at a glance, the truth of Euclid's propositions in geometry, without attending to every part of the process requisite for ordinary minds, we may reasonably conclude, that, in a world where the physical and moral obstructions to intellectual energy are removed, every science, and every relation subsisting among corporeal and intellectual beings, will be more clearly, rapidly, and comprehensively perceived and understood.

Many striking instances have occasionally occurred, of the capacity and vigour of the human mind, even amidst the obscurities, and the obstructions to mental activity which exist in the present state of things. The illustrious *Pascal*, no less celebrated for his piety than for his intellectual acquirements, when under the age of twelve years, and while immersed in the study of languages, without books, and without an instructor, discovered and demonstrated most of the propositions in the first book of Euclid, before he knew that such a book was in existence—to the astonishment of every mathematician; so that, at that early age, he was an inventor of geometrical science. He afterwards made some experiments and discoveries on the nature of sound, and on the weight of the air, and demonstrated the pressure of the atmosphere; and, at the age of sixteen, composed a treatise on *Conick Sections*, which, in the judgment of men of the greatest abilities, was viewed as an astonishing effort of the human mind. At nineteen years of age, he invented an arithmetical machine by which calculations are made, not only without the help of a pen, but even without a person's knowing a single rule in arithmetick; and by the age of twenty-four, he had acquired a proficiency in almost every branch of human knowledge, when his mind became entirely absorbed in the exercises of religion.—The celebrated *Grotius*, at the age of thirteen, only a year after his arrival at the university of Leyden, maintained publick theses in mathematicks, philosophy and law, with universal applause. At the age of fourteen, he ventured to form literary plans which required an amazing extent of knowledge; and he executed them in such perfection, that the literary world was struck with astonishment. At this early age he published an edition of *Martianus Capella*, and acquitted himself of the task in a man-

ner which would have done honour to the greatest scholars of the age. At the age of seventeen he entered on the profession of an advocate, and pleaded his first cause at Delf, with the greatest reputation, having previously made an extraordinary progress in the knowledge of the sciences.—The *Admirable Crichton*, who received his education at Perth and St. Andrews, by the time he had reached his twentieth year, was master of ten languages, and had gone through the whole circle of the sciences as they were then understood. At Paris he one day engaged in a disputation, which lasted nine hours, in the presence of three thousand auditors, against four doctors of the church and fifty masters, on every subject they could propose, and having silenced all his antagonists, he came off amidst the loudest acclamations, though he had spent no time in previous preparation for the contest.—*Gassendi*, a celebrated philosopher of France, at the age of four, declaimed little sermons of his own composition; at the age of seven, spent whole nights in observing the motions of the heavenly bodies, of which he acquired considerable knowledge; at sixteen, he was appointed professor of rhetorick at Digne, and at the age of nineteen, he was elected professor of philosophy in the university of Aix. His vast knowledge of philosophy and mathematicks was ornamented by a sincere attachment to the christian religion, and a life formed upon its principles and precepts.—*Jeremiah Horrox*, a name celebrated in the annals of astronomy, before he attained the age of seventeen, had acquired, solely by his own industry, and the help of a few Latin authors, a most extensive and accurate knowledge of astronomy, and of the branches of mathematical learning connected with it. He composed astronomical tables for himself, and corrected the errours of the most celebrated astronomers of his time. He calculated a transit of the planet Venus across the sun's disk, and was the first of mortals who beheld this singular phenomenon, which is now considered of so much importance in astronomical science.—Sir Isaac Newton, the fame of whose genius has extended over the whole civilized world, made his great discoveries in geometry and fluxions, and laid the foundation of his two celebrated works, his '*Principia*' and '*Opticks*,' by the time he was twenty-four years of age; and yet these works contain so many abstract, profound and sublime truths, that only the first rate mathematicians are qualified to understand and appreciate them. In learning mathematicks, he did not study the geometry of Euclid, who seemed to him too plain and simple, and unworthy of taking up his time. He understood him almost before he read him; and a cast of his eye upon the contents of his theorems, was sufficient to make him master of their demonstrations. Amidst all the sublime investigations of physical and mathematical science in which he engaged, and amidst the variety of books he had constantly before him, the *Bible* was that which he studied with the greatest application; and his meekness and *modesty* were no less admirable than the variety and extent of his intellectual acquirements.—*J. Philip Baratier*, who died at Halle in 1740, in the twentieth year of his age, was endowed with extraordinary powers of memory and comprehension of mind. At the age of five, he understood the Greek, Latin, German and French languages; at the age of nine he could translate any part of the Hebrew Scriptures into Latin, and could repeat the whole Hebrew Psalter; and before he had completed his tenth year, he drew up a Hebrew lexicon of uncommon and difficult words, to which he added many curious critical remarks. In his thirteenth year he published, in two volumes octavo, a translation from the Hebrew of Rabbi Benjamin's 'Travels in Europe, Asia and Africa,' with historical and critical notes and dissertations; the whole of which he completed in four months. In the midst of these studies, he prosecuted philosophical and mathematical pursuits, and in his fourteenth year invented a method of discovering the longitude at sea, which exhibited the strongest marks of superiour abilities. In one winter he read twenty great folios, with all the attention of a vast, comprehensive mind.

Such rapid progress in intellectual acquirements strikingly evinces the vigour and comprehension of the human faculties; and if such varied and extensive acquisitions in knowledge can be attained, even amidst the frailties and physical impediments of this mortal state, it is easy to conceive, with what energy and rapidity the most sublime investigations may be prosecuted in the future world, when the spirit is connected with an incorruptible body, fitted to accompany it in all its movements; and when every moral obstruction which now impedes its activity shall be completely removed."

MATHEMATICAL RULE FOR TUNING KEYED INSTRUMENTS.



DIRECTIONS FOR TUNING BY THE ABOVE PLATE.

The figure W. X. Y. Z. represents nineteen keys of the organ, Piano Forte, Harpsichord, &c. The first on the left hand marked C 1, may represent any C of the keys, provided there be as many above it, as are drawn in the figure, but it is most convenient to begin with C nearest the centre of the fingerboard, which must be tuned by a tuning fork or otherwise, to the pitch required. The other keys, as in the above figure, are then to be tuned by fifths and octaves only, seven semi-tones above or below any note constituting a fifth to that note, and twelve semi-tones an octave, which is the principle whereon this mode of tuning is founded. G 2, is next to be tuned, making it a fifth above C 1; then D 3, a fifth above G 2; then D 4, an octave below D 3; next A 5, a fifth above D 4; E 6, a fifth above A 5; and E 7, an octave below E 6; thus advancing by two fifths upwards, and an octave downwards, through the nineteen keys above described, except that from F♯, 10, but one fifth upwards is to be taken, as may be seen by the figures, then proceed as before, until the order of the figures stops on C 19, if that note then prove to be a correct octave with the first, or C 1, the work is right, if not it must be repeated until it will prove correct by this test. All the other keys of the instrument are to be tuned octaves to the above nineteen. N. B. In tuning the fifths, they must be kept as flat as they will bear.

The notes accompanying the figure will assist in explaining it more thoroughly, where the letter U denotes that the chord is to be taken upward, and D downward.

As strings frequently break in tuning, the following remarks for replacing them, may be useful to those who shall make a first attempt. A loop at the stationary end of the string is to be first made, by bending the wire near the end, until the parts cross each other at a considerable angle; the intersection of the wire is then firmly held between the thumb and finger of the left hand, while it is twisted in the right, by means of the hook at the end of the tuning hammer, or by the fingers. In twisting the wire, particular attention must be paid, that the parts twist equally with each other. The other end of the string is to be wound on the straining pin thus, after securing the loop to the stationary pin in the instrument,

hold the straining pin horizontally with its top in the right hand, and passing the wire under it, bring the end round, so that it shall be confined by two or three of the first turns of the string, which must be drawn straight, and wound carefully, by rolling the pin in the fingers until it comes over the hole in which it is to be placed, and hammered down. The straining pin must then be turned by the tuning hammer, until the string is brought to its proper tone. Care must be taken in winding, that the turns advance regularly without riding, (except a few of the first,) and that they end in such part of the straining pin, as will bring the string to a proper bearing on the bridge, when the pin is down in its station.

In consequence of the inflexibility or stiffness of the larger strings of an instrument, a difficulty attends putting them on the straining pins, to obviate which, it is necessary to put the pin into the tuning hammer before winding, and to wind the turns over each other more than is requisite for the smaller strings; then keeping the string stretched very tight, put the pin in its place while it remains in the hammer, and with one hand steadily drawing upon it to prevent it from slipping on the pin, turn with the other, until it is stretched in the instrument to a considerable tension.

Much more might be written on the subject of tuning, but it might perplex rather than instruct; and those who wish to acquire the art, in its nearest approach to perfection, must be indebted to the practical aid of a master."

We extracted the above description from the Useful Cabinet, (a periodical sometime since published in this place.) We are informed by an *Amateur*, that it is very correct, and possesses considerable merit.

CENTENNIAL CELEBRATION.

Nothing is more familiar than the use of the terms new style and old style. But in this, as in many other cases, words are used without precise and adequate conceptions of the subject to which they refer. To obviate this difficulty in the present instance, we present to the publick, one of the most clear and scientifick statements that we have ever seen, from the pen of one gentleman, with the confirmation of another, both, distinguished for genius and learning. Our readers, we presume, will consider it conclusive upon the question; and as entirely supporting the decision of the city authorities in their selection of the day for the anniversary.

Federal-Street, March 12, 1830.

Dear Sir,

The enclosed remarks were occasioned by the doubts, which have been repeatedly and in different modes expressed, respecting the day appointed by the city government, for the centennial celebration of the foundation of the city, in 1630. In concurrence with my respected associates of the committee of the Historical Society, it is thought proper to submit them to your inspection; and I have, accordingly, the honour to transmit them to you, together with Mr. Bowditch's note on the subject. That gentleman did me the favour to peruse the original sketch; and his opinion on the main question, will, it may be presumed, remove the doubts which have been entertained, and relieve those, who have had an agency in the appointment of the day, from any apprehension of having made a mistake.

After the return of the papers, sent to Mr. Bowditch, some variations and additions were made in copying, but none materially affecting the argument. I ought to say, however, that he is to be considered as only giving his sanction in regard to the main point; that the day assigned is correct.

Respectfully your obedient servant,

J. DAVIS.

Hon. H. G. Otis, *Mayor of Boston.*

Remarks on the Julian and Gregorian styles, in reference to the day appointed for a centennial celebration of the first settlement of Boston.

The city authorities of Boston, in determining on a centennial celebration of the foundation of the city, have appointed the 17th of September, in the present year, to be observed, as corresponding to the 7th of September, 1630. The propriety of the reference of that date, in 1630, to the 17th of September next, has been doubted. It may be reasonably presumed, that those who made the appointment, did it considerately. It is believed to be correct, and the following observations are intended to express the grounds of that conviction.

When the reformed calendar was adopted, in 1752, in the British dominions, of which we then formed a part, the difference between the two styles, the Julian and the Gregorian, was *eleven* days, and that number of days was, of course, suppressed in the correction. A continual reference to this number of *eleven* days, during the re-

mainder of that century, by those who had been accustomed, altogether, to the old style, seems to have infixed an impression, that *eleven* days constitute the invariable difference to be assumed, not only for the last century, but also as to all previous dates. Hence we find, that the majority of those, who have doubts respecting the correctness of the assigned day, for the proposed celebration, when they are asked for a preferable substitute, will designate the 18th of September, adding *eleven* days to the agreed date, (o. s.) in 1630. There are others, however, who contend, that we are to be governed by the *present difference* in the styles. Russia and Greece, say they, still adhere to the old style, and the difference of dates between those nations and us, is now *twelve* days. They are, therefore, prepared to add *twelve* days to the day (o. s.) intended to be commemorated, bringing us to the 19th of September.

We have, thus, three different days recommended for observance; the 17th of September by the city government, and by a committee of the Massachusetts Historical Society; the 18th, or 19th, by those who are not satisfied with the designation of the *seventeenth*.

Which of these is the true date in reference to September 7th, (o. s.) 1630?

The inquiry is within the serene region of the exact sciences, and, certainly, admits of a correct answer.

To come to a more ready result, it will be well to consider the particulars in which the disputants will be found to agree.

The point of departure is not controverted; and it is understood to be agreed, that the difference of styles, in 1630, was *ten* days, and, of course, that September 17th, in the Gregorian style, was *then* a correct expression of September 7th, old style.

As it is a centennial celebration which is intended, all are supposed to agree in this, also, that we have reference to the completion of two hundred years, since the 7th of September, 1630, when Boston received its honoured name.

The next inquiry is, what description of years are we to adopt in making our calculation? Shall we take the *Julian* year, of 365 days, 6 hours, (so far exceeding the actual year as to have created confusion,) or the *Gregorian* year the year of the reformed calendar, which more nearly, and almost exactly corresponds with the tropical year? Now, the Gregorian Calendar has so much to recommend it, and is so decisively preferable, that we could not but be disposed to adopt it, even if it were not legally established. If, indeed, the Julian style had continued to this day, we might reluct at disturbing habitual impressions, by contending for a more accurate calculation, in reference to a centennial observance, and should probably, acquiesce in taking the same nominal day, the 7th of September, though involving a considerable errour, by the accumulation, in two centuries, of the annual excess of the Julian beyond the tropical year. That difference amounts to an entire day in *one hundred and twenty-nine years*; (a) but the Gregorian Calendar constitutes a year so nearly coinciding with the natural or tropical year, that about *four thousand years* must elapse before the difference will amount to a day. In reference, therefore, to the disputed question, under consideration, the Gregorian Calendar is assumed as affording the true measure. This, indeed, is implied in the very terms of the dispute; for, whether we take the 17th, 18th, or 19th of September, for the true centennial day, there is involved, in each, a comparison of styles, which considers the new style as the standard.

In the two centuries since the foundation of Boston, which will have elapsed in September next, there will be 73,050 days in the Julian reckoning, but, only 73,048, days according to the Gregorian computation, by which the years 1700 and 1800, that were Bissextile in the Julian Calendar, were considered as common years. The two centuries, therefore, in the Gregorian computation, will have expired on the 5th of September next, (o. s.); and in a comparison of the two styles, after the lapse of the two centuries, the 5th of September will be the true representative, (o. s.) of the 7th of September, in the same style, in 1830. Add *twelve* days, the present difference of style, and we have the 17th of September, (N. S.) the same as by adding *ten* days to the seventh, in 1630.

It thus appears, in reference to a computation in Gregorian years, that those who contend for the 19th of September, would have the celebration two days after the completion of the second century. Those who would add *eleven* to the 7th, diminish the errour, one day, but are still incorrect in reference to the Gregorian Calendar. If such additions, or any other additions than the true difference of style, in 1630, be attentively analyzed, they will be found to involve a departure from the reformed calen-

dar, and to introduce an allowance for the errour in old style, since 1630, which the application of the new style to the date in that year, renders altogether unnecessary. The true rule, it is apprehended, is, as to all dates, to ascertain what was the difference of style in their respective centuries, and having the given day correctly commuted and expressed, in the new style, according to the difference at that time, to adhere to that expression, as a just representative of its extinguished predecessor.

From the accumulation of errour in the old style, the difference between the two styles, has now advanced to *twelve days*, and so it will continue for the present century. In the last century it was *eleven* days; in the 17th century, *ten* days; but the reformed calendar is of a more stable character, it is like a well constructed chronometer compared with a clock, and if the 17th of September, (N. S.) truly represented the 7th (O. S.) in 1630, which it is believed, no one disputes, it does so still. If the 17th of September, in the year 1930 and 2030, will represent the 17th of September, of the present year, it must be difficult to assign a reason, why a like correspondence should not exist in respect to the two preceding centuries, to 1730, and 1630.

Considering that the difference between the several days suggested, for the proposed celebration, amounts to but two days, at most, the dispute may appear somewhat frivolous; but, as some day must be selected, it is well to have it correct, unless a manifest convenience or other sufficient motive, should induce a deviation. A recurrence to true principles, on this subject, is, also, of some value, by affording a rule of comparison and allowance, in reference to dates more ancient, and, indeed in regard to all dates, in the old style. In historical and other researches, it may be satisfactory, though not often very important, to ascertain the correspondence of dates with our calendar. (b) An intelligent gentleman who had doubts as to the propriety of the day selected, and who was inclined to substitute the 18th of September, was asked what addition he would make to the day of the discovery of America, by Columbus, October 12, 1492. He would add, he said, *eleven* days; and, according to his view of the subject, a celebration, in 1892, at the completion of the fourth century, since that memorable day, should be on the 23d of October; but if the views, which have been above exhibited, be correct, it should be on the 21st, being the same day, (N. S.) which corresponded to October 12, 1492, when the difference of style was only *nine* days. We are here contemplating a date prior to the first introduction of the Gregorian style; but this circumstance does not impair the argument, or vary the conclusion. The principles of the reformed style have an apposite reference to any period, and furnish a sure standard of comparison for dates previous to its adoption, as well as for those since that time. Those who carefully consider the constituent characters of the two styles, will admit their correct application to the above mentioned period of four hundred years. The following calculation will illustrate the views that have been expressed.

In four centuries, in the Julian reckoning, there are	146,100 days
In the Gregorian reckoning,	146,097 "
Difference, ...	3 "

So that four hundred Gregorian years, since the discovery of America, will be completed on the 9th of October (O. S.) 1892. Adding the difference of style, in this century, *twelve* days, we have the 21st (N. S.) the same as corresponded to the 12th (O. S.) in 1492, when the difference was but *nine* days. (c)

It may be satisfactory, in this connexion to notice the near agreement of the Gregorian regulation with the actual tropical year. The Gregorian term of 400 years being three days less than a like term in the Julian Calendar, renders the Gregorian year equal to . . . . . 365*d.* 5*h.* 49′ 12″

The tropical year, according to Biot,* contains 365*d.* 5*h.* 48′ 50″

Difference, ... 22

This annual difference of twenty-two seconds, is so inconsiderable, that, for practical purposes, certainly for the purpose to which these observations relate, it may be disregarded. If the true length of the year be, as assumed from Biot, our calendar will not require correction until the year 5600; by that time the small annual difference between the Gregorian year (d) and the true year, reckoning from the year 1600, will amount to *one day*, and the year 5600, in-

* Astron. Physique. The same measure of the year is adopted in the *American Almanac*. The reception of that respectable performance, will, it may be hoped, encourage the ingenious and meritorious compilers to furnish, annually, a similar publication.

stead of being bissextile, as it is to be, according to the terms of the regulation, should be considered as a common year. This will depend, however, on the true length of the tropical year, to which future observations may, possibly, assign a measure varying, one or two seconds, from the present estimate; but as to the precise period when a correction may be requisite, as Montucla playfully observes, "there will be time enough to consider of it." (e)

In these views of the Gregorian Calendar, we cannot but recognize its claims to confidence and respect. It is a guide for ages to come, and, in like manner, a standard in the comparison of past dates. If the 4th of July, the birth day of our independence, will be truly represented by the 4th of July, for nearly 4000 years to come, so surely will the 17th of September next, represent the 17th of September, 1630. The dispute, therefore, may be reduced to the single question, whether that was the true relation of the styles, to each other, when Boston was founded. If it were so, we should adhere to the date in new style, *then* corresponding to the 7th of September, and dismiss, as to that date, all further regard to the old style, and what, to some, is the perplexing puzzle of the *eleven* days. If, on the day, when Boston was named, some interesting event had occurred in Canada, demanding, according to the opinion or feelings of the French settlers, a like centennial celebration, their date would be the 17th of September; for with them the Gregorian style was then in use, having been established, in Catholick countries, in 1582, twenty-six years before the foundation of Quebeck, by Champlain. Their centennial celebration, of course, would have been first on the 17th of September, 1730, and, again, it should be on the 17th of September, in the present year. In this, it is presumed, all will agree, that they would be correct. We are now to celebrate an occurrence happening on the *same day*, and yet, as not a few contend, we are to consider the completion of the centuries to be one or two days after the Canadian reckoning, though we both have reference to the same calendar; they, exclusively; we, in this instance, as a standard in comparison with a defective one that is superseded. Since 1752, we have been in exact concurrence with the Canadian dates, and with those of all nations who have adopted the Gregorian style, and shall continue to be so; and no reason can be conceived why, also, in all comparison of dates, before 1752, we should not come to the same uniform results.

March 6, 1830.

[NOTES.]

(*a*) The exact term is 128.9552, or 1*h*. 4′ 31″ less than 129 years, on the supposition that the length of the tropical year is 365*d*. 5*h*. 48′ 50″

(*b*) In Rees' Cyclopædia, under the article *Style*, will be found a convenient table, showing by what number of days the new style differs from the old, from 5900 years before the commencement of the Christian era, to 5,900 years after it; by which it may be readily determined what number of days to add or subtract from the old style, to reduce it to the new. In the year 200, there was no difference of style. In the succeeding centuries the correction is to be made by additions to dates in the old style, increasing in amount as we advance. In the centuries preceding the year 200, the process is to be reversed, and the correction is to be made by subtraction. For example, the crucifixion of our Lord, according to the most approved chronologists, was on *Friday*, April 3, A. D. 33. The difference of style was, in that century, two days, reducing the date to April 1st, new style, which we shall find was on *Friday*. It may be of use, here to remark, that the suppression of days, in correcting the style, makes no alteration as to the days of the week. If then, in any reduction of old style to new style, we come to a different day of the week, there must be a mistake in the quantity added, or subtracted.

(*c*) This instance, (the date of the discovery of America,) is pertinently adduced by the writer of an article in the Daily Advertiser, under the signature of *Simplex*, who, it is satisfactory to find, comes to the same conclusion, that the 21st of October would be the true day to be observed, in the case supposed. The correctness of the assigned day, for the Boston celebration, is well sustained by his remarks. There is one incidental mistake, not affecting, however, the main position. He directs the addition of *nine* days in 1530; but the difference of style, in that century, was *ten* days.

(*d*) In speaking of the *Gregorian year*, in this place, or in any preceding passages, it is not to be understood as implied, that a civil year, thus nearly agreeing with the tropical year, was assigned, in terms, by the calendar. That expression is merely intended to indicate the average year, resulting from the suppression of three bissextile days, in four hundred years.

Thus $\frac{146097}{400}$ 365.2425 equal to 365*d*. 5*h*. 49′ 12″ the average Gregorian year.

(*e*) Montucla, considering the annual excess of the Gregorian year to be only ten or

eleven seconds, assigns a far more remote period, (seven or eight thousand years,) for the requisite correction.—"Si l'annee solaire n'est que de 365 jeurs, 5 heures, 49′ 1″ ou 2″ comme le pretend M. Bianchini, il se fera une tres lente anticipation de l'equinoxe, et elle ne sera que d'un jour en sept a huit mille ans. Pour retablir l'equinoxe a sa place, il faudra, vers ce temps, faire quatre seculaires, de suite, non bissextiles, ainsi l'on a le temps d'y penser."

[Hist. des Mathem. I. 679.

Boston, March 6, 1830.

My Dear Sir,

I have read the papers you sent me, and approve of them. I have not the least doubt that the result you have come to, in taking Sept. 17th, is correct: it is unnecessary to state any reasons for this opinion, in addition to those you have given, which are quite satisfactory. With much esteem,

N. BOWDITCH.

Hon. Judge Davis.

LAW OF PATENTS.

(Concluded from p. 25.)

If the applicant should find it difficult or almost impossible to describe his discovery, invention or improvement, in the specification, without references to the drawing, he must transmit to the office two copies of the drawings, one to be deposited in the patent office with his papers, and the other to be annexed to the patent, to which it will refer.

[P. S. It has been decided by some of the judges who have tried patent cases, that the applicant for a patent ought to describe, in his specification, what is already known of the science or art for which he solicits a patent, or give such a description of the machine or apparatus, now in use, or so much thereof as may be connected with his invention; then state what he specifically claims as his own invention; for if his specification include *more than his own invention*, unless by permission of some other inventor he obtain the liberty of inserting small improvements or suggestions, his patent would be vitiated.—1820.]

It is material that the specification be in good language and correctly written, as it is transcribed into the patent, and the original papers will be deposited in an office that will hand them down to posterity; by which the honour of the country is concerned in this attention. The modest inventor will no doubt, exclude those panegyricks on the excellence of his invention or discovery, which abound sometimes in the productions of the inferiour genius, but which ought not to enter into the patent.

The following, or a similar oath or affirmation, taken [before a judge of any of the courts, or a justice of the peace, or any person qualified to administer an oath,] by the applicant or applicants, must be subjoined to the specification, if citizens of the United States.

FORM.

County of ———, } *ss.*
State of ———, }

On this ——— of ———, 183–, before the subscriber, a justice of the peace, in and for the said county, personally appeared the aforenamed A. B. and made solemn oath [or affirmation,] according to law, that he verily believes himself to be the true and original inventor or discoverer of the art, [machine, invention, or improvement, composition of matter, etc.] above specified and described, for ——— (mention here the object or intention,) ———, and that he is a citizen of the United States.

——— ———, Just. Peace.

If not a citizen, (or citizens,) the following addition must be made in the declaration, 'that he verily believes himself to be the true and original inventor or discoverer of the art, etc. *and that the same hath not, to the best of his (or her) knowledge, or belief, been known or used either in this or in any foreign country.** Also, that he (or she,) hath resided in the United States for two years and upwards.'

It is proper that the title of the discovery, invention or improvement, in the oath, should correspond with the title given in the petition.

It is not necessary that the time of residence should immediately precede the application.

If any inventor or discoverer should die intestate before an application be made for a patent, his legal representatives may apply for the patent, in trust for the heirs at law; otherwise in trust for the devisees.†

The specification must be accompanied by a good drawing, in perspective, of the whole machine or apparatus, 'where the nature of the case admits of drawing,‡ or with specimens of the ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment, where the invention is of a composition of

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* Laws of the U. S. vol. v. ch. xxv, p. 86.
† U. S. laws, vol. v. ch. xxv. sect. 2, p. 86.
‡ Ibid, vol. ii. ch. xi. p. 202.

matter.' 'And such inventor shall moreover, deliver a model of his machine, provided the secretary shall deem such model necessary.' It is requisite, in giving a drawing of the machine, to give also sectional drawings of the interiour, when the machine is complex; and every drawing should be accompanied with explanatory references. If the machine be complex, a model will likewise be necessary, not only to explain and render comprehensible to a common capacity, but also to prevent infringements of rights; for many will plead ignorance of drawings who cannot avoid conviction by wheels and pinions.

The drawings ought not to exceed a quarto size, and if confined to octavo they would be still better, where it can be done conveniently and distinctly.

Many of the drawings in this office are executed in a very handsome style, and do much credit to the gentlemen whose names are ascertained. If the artists would always sign them, with their directions, information might be given to the applicants for patents, where to apply for drawings.

The papers must be all sent directed to the superintendent of the patent office, which of course, renders them free of postage. It is requested that all the writings be on paper called *foolscap*, that they may suit the files and records. If models be sent, their freight or carriage hither must be paid, and before packing them, the name or names of the inventor or inventors should be written thereon, with the name of the machine, and the date; for, sometimes on receiving them, it is difficult to know to whom they appertain.

Congress, being impressed with a high sense of the value of the inventions of our citizens, have purchased an elegant and extensive building, wherein preparations are made for the accommodation of a very numerous collection of the machines illustrative of the ingenuity displayed; and this MUSEUM OF THE ARTS, it is presumed, will stimulate the ingenious to send the models of their machines and inventions in a style that will rather honour than discredit themselves and our country.

Copy-rights of books, prints, charts, maps, etc. are secured 'by depositing, before publication, a printed copy of the title of such map, chart, book, or books, in the clerk's office,* of the district court, where the author or proprietor shall reside, who will record the same; and the author or proprietor shall, within two months from the date of the record, cause a copy of the said record to be published in one or more of the newspapers printed in the United States, for the space of four weeks; and if a map or chart, shall cause the following words to be impressed on the face thereof; viz:—Entered according to act of congress the —— day of ——, 183–,–[here insert the date when the same was deposited in the office,] by A. B. of the state of —— [here insert the author's or proprietor's name, and the place and state where he resides] ——.'

Any person wishing to re-publish a copy-right-book, print, or map, must first obtain leave in writing from the proprietor, signed before two witnesses, and any person publishing a map, print, etc. without first complying with the law, is liable to a penalty of one hundred dollars.

Within six months of publishing the map, chart, book or books, the author or proprietor shall deliver, or cause to be delivered, to the secretary of state,† a copy of the same; and when deposited and entered in the department of state, a certificate will be returned of its being received.‡ This will secure the sole right of publication, fourteen years, to the author or proprietor, if a citizen of the United States, or resident therein, 'And, if at the expiration of the term, the author or authors, or proprietors, or any of them, be living, and a citizen or citizens of these United States, or residents therein, the same exclusive right shall be continued to him or them, his or their executors, administrators, or assigns, for the further term of fourteen years: provided he or they shall cause the title thereof to be recorded and published in the above manner, within six months before the expiration of the first term of fourteen years, aforesaid.' In securing designs for paper hangings and ornaments for rooms, etc. a specimen of each should be deposited in the clerk's office, where the inventor resides, who will describe, in writing, all the ornaments, and the colours used in each, so as to designate them with the changes that are proposed to be used in changing the ground and general tint. Let each paper thus described, be numbered 1, 2, 3, etc. and after entering them in the clerk's office, and publishing them as directed, let a spe-

* See an act for the encouragement of learning, etc. Laws of the United States, v. i. ch. xv. sec. iii. p. 121.

† Laws of the United States, vol. i. sect. iv. p. 122.

‡ Ibid, sec. i. p. 118, 119.

cimen of each be sent to the secretary of state, or through him to the person who directs the patent office, with corresponding descriptions and numbers; and a certificate of such a deposit will complete the requisitions of the law in securing the exclusive right to each original production of genius.

WM. THORNTON.

LIST OF AMERICAN PATENTS,

WITH EXEMPLIFICATIONS.

From the Franklin Institute.——For Oct. 1829.

12. For an improvement in Bell Hanging; James Russell, New-York, October 10.

The particular arrangement of the parts of this apparatus cannot be explained without a drawing. The object proposed is to save room, and make one bell answer for a number of apartments. A box, or case, is fixed in the room containing the bell; within this box there are a number of sliding bars corresponding with the number of apartments from which bell wires are to extend. There are also in this box a number of plates of metal, equal to the number of sliding bars, or of wires; these plates are so constructed, that when a wire is pulled, one of the plates of metal tilts, by the action of its corresponding bar, and a disk, attached to it, having the number of the room on it, projects through a groove formed in a brass plate at one end of the box, and thus indicates the apartment where the servant is wanted. Each of the bars is made to act upon the same bell, and when a second wire is pulled, it replaces the index of the former, as its own is displayed.

The contrivance is ingenious, and will evidently answer the purpose intended; it is particularly calculated for large establishments.

13. For an improvement in the machinery for Spinning Cotton, Silk, Flax, and other materials; George Addison, and Samuel H. Stevens, New-York, October 10.

The end proposed to be accomplished by this invention is similar to that which Mr. John Thorp, of Providence, and some others, claim to have attained by other means. Those intimate with the subject will recollect the plans of Mr. Thorp, for dispensing with the common flyers. The present plan bears a near resemblance to the "Ring groove spinner."

Circular openings are cut out in the wave rail, around the spindles. Metallick rings, of a suitable size, are fixed above, or within, these openings. These rings are made very true, and smooth, and in such a form that a light piece of metal may clip round their edges, by means of small projections, or wires, attached to them for that purpose, this latter piece is called a traveller; it passes freely round the ring, being carried by the thread as it is spun; there is an opening, or eye, in the traveller, through which the thread passes.

The specification notices the various plans which have been heretofore pursued, for the purpose of showing that they differ, specifically, from that now patented. There is no particular claim, as nothing is described but the part which is accounted new. It is stated that "the general resulting benefit of this improvement is of great importance in the art of spinning. The operative parts of spinning machinery, viz. the flyer, and the bobbin, and spindle, by means of this invention, may be so much reduced in size and weight, that spinning machines having this improvement need not be so massive, or heavy, or strong, or occupy so much room as heretofore. Buildings of less solidity and extent may take the place of the massive and expensive structures heretofore deemed necessary, and the power used to drive a thousand spindles on the old construction of machinery, will drive twice as many on this construction."

14. For making Bit-Stocks of Composition; Augustus Phelps, Marlborough, Hartford county, Connecticut, October 10.

The following is the specification:

"The bit-stock is composed of cast-iron and brass. The main, or lower part, is of cast-iron, the head and neck, or top part, of brass. The principle and operation of said bit-stock are the same as those that are now in general use."

We have known bit-stocks of cast-iron, with heads of wood, sheet-iron, brass, or copper, for more than thirty years. Many hundred of them, made in imitation of the celebrated Scotch stocks, have been imported from England, and the purchaser has frequently found, to his cost, that his iron stock has broken by a fall from his bench, and that it was not in the power of the smith to weld it.

We can assure the inventors, or discoverers, of cast-iron hammers, tire, horse shoes, stocks, &c. &c., that they have been so completely forestalled by the English in the art of casting all those articles which ought to be made of wrought iron, as scarcely to leave room for any *new discovery* upon the subject.

15. For a Machine for Making Shingles; Joel Barnes, Cornwall, Litchfield county, Connecticut, October 10.

A wheel of wood, about six feet in diameter, is made to revolve, vertically, upon gudgeons; a knife, or cutter, is fixed upon one face of this wheel, projecting from it the thickness of a shingle. The bolt, or block, to be cut, is placed upon a proper bearing attached to the frame, and is forced by hand, against the face of the wheel when in motion; the wheel is to revolve about sixty times in a minute. There is, of course, an excavation in the wheel, under and behind the knife, for the escape of the rived pieces. This constitutes the whole of the machine, and as there is no claim to any particular part, we are to consider *the whole* as new.

16. For a Rolling Valve for supplying the boilers of steam engines with water; Elam Young, Tate township, Clermont county, Ohio, October 10.

The rolling valve is in form like the key, or plug, of a common cock, fitted into a socket, and standing horizontally in a reservoir of water, from which the boiler is to be supplied.

The valve, or key, has two chambers formed in it, at 90 degrees apart; these are filled with water alternately, through perforations in the socket, the valve is worked backwards and forwards by means of a pitman from a crank, which carries the water down to an opening in the lower part of the socket, communicating with the boiler. It is intended that the valve should be self-regulating, by causing the chambers to contain the proper quantity of water for the generation of steam.

The claim is, "the supplying the boilers and generators of steam engines by means of a rolling valve."

The great objection to valves of this description is their wear; the four-way cork, and rotary, or vibrating valves, acting upon this principle, are necessarily subject to this objection, but for which, a valve, such as that now described, would be preferable to a forcing pump. The idea of such a valve is not new; we cannot immediately turn to any printed evidence of this, but it has been familiar, and matter of frequent conversation with us for years.

17. For an improved Washer and Churner; George B. Gibbs, Pike, Bradford county, Pennsylvania, October 10.

Mr. Gibbs thus describes his washer and churner, "the form is, or resembling, the frustrum of a pyramid; the diameter of the base from two to four feet, that of the top from six to twenty inches, through which passes a pin, or fulcrum, upon which a lever, from three to ten feet, swings, with or without a joint, cog, or wheel, to which is attached an open paddle, with two posts, which are connected by two or more slats, which is moved within the cylindrical box by the above mentioned lever." GEORGE B. GIBBS.

If the above description appears to be obscure, we can assure our readers that the drawings which accompany it possess the same quality in an equal degree; it is much to be doubted, however, whether any thing be lost by this defection, as we think that most housekeepers employ a better washer, and those who keep cows a better churner, than most of those which are patented, although they stand upon two feet, and have, therefore, a lesser base than that of Mr. Gibbs.

18. For a Leather Tree-saddle; Matthias Holdeman, Trapp, Montgomery county, Pennsylvania, October 10.

As the title indicates, this patent is taken for making a saddletree of leather, instead of wood. The mode of cutting and joining the pieces so as to obtain the proper form, is described in the specification; when made, the whole is to be well sized, or stiffened, with glue. There is no particular claim, the object being to secure the right to make saddles with leather trees.

19. For an improvement in the common Saw-Setter; Ira Hatch, Westford, Chittenden county, Vermont, October 12.

This is a new edition of the saw-set, but we cannot say an improved one, as it is precisely like such as have been before patented. The set is made in the common way; it has upon its handle, or shank, a sliding piece, tightened by a screw with a gauge screw tapped into it, which, when the proper set has been given to the tooth, will bear against the side of the saw. What is claimed as new, is, "the gauge to regulate the bevil required to the teeth in setting the saw."

There are some half dozen patent saw-sets operating upon this principle, but we believe that workmen in general prefer to set their saws by the old saw-set, or with a punch. Were saws soft, or perfectly equal in their texture from end to end, these patent saw-sets would answer a good purpose; but this, according to our experience, is rarely the case, and consequently the eye and the hand become the best guides.

20. For Raising Boats from one Level to another, on Canals, by means of inclined planes; Ephraim Morris, Bloomfield, Sussex county, New-Jersey, October 13.

The design is to draw a cradle, or car, containing a boat, up an inclined plane, by the power of water wheels. As this is not new, the patent is taken for several improvements which are specified, but which cannot well be described in words. Hitherto the inclined planes which have been constructed have disappointed the anticipations of their inventors; and, although we have often been told of perfect success in newly constructed works of this kind, the searching operator, Time, has pointed out great defects, and has still left a good inclined plane, a desideratum. We are not aware that the plan now proposed offers any striking novelty; but should it remove the difficulties experienced in existing structures, its merits would be of a high order.

21. For an improvement in the mode of Hanging and Straining Saws; Levi Chapin, Walpole, Cheshire county, New-Hampshire, October 13.

The plan proposed is intended to render the ordinary saw frame unnecessary in the straining of mill saws. Two wheels, or drums, are placed one over the other, each working upon gudgeons. The boxes of the upper gudgeons are to be stationary, those of the lower ones are to work in a slat, so that by means of a wedge, or a lever and weights, the drum may be forced down for the purpose of straining the saws. A band, or chain, passes over the upper drum, and another under the lower drum; to the ends of these bands, or chains, saws are to be fixed by stirrups; the two chains, and two saws, when thus united, form a continued band round the two drums, or wheels; an alternating crank motion, communicated to one of the drums, will cause the saws alternately to ascend and descend. The novelty, and improvement claimed "consists in hanging two saws, without the use of saw frames and gates, and wholly relieving the crank, or power, necessary to operate saws, from the heft or burden of any apparatus necessary to hang or strain saws, leaving all the power to operate the saws in the work. The principle is intended to embrace all the various forms in which sawing is required, whether by means of wheels, cylinders, or drums, or parts of either, or by use of chains, ropes, belts, or springs, or by forcing the strain by the power of the wedge, lever, or screw, of whatsoever materials they may be formed."

The above claim appears to us to be much too broad and general. The particular mode described by the patentee is probably new, but the idea of a saw acting as a band, strained over drums, is old. By turning to the article SAW, in Ree's Cyclopædia, it will be seen that a patent was obtained in England, many years ago, for a saw forming a continued band, working over two wheels, or drums, not by a vibratory, but by a continued motion.

22. For a machine for Scalding and Napping Hats; Daniel Baldwin, Ithaca, Tompkins county, New-York, October 15.

The machine described is a sort of box, to be placed over a planking kettle, or large boiler. At the top of the box is a pulley, worked by a rope, for the purpose of letting from ten to fifty hats at a time descend into the heated liquid, or drawing them up at pleasure. There, of course, is no bottom to the box, and the hats are contained in

a cloth suitably fixed for the purpose, and which, with other parts, is particularly described in the specification.

23. For a Feather Cleaning Machine; Charles T. upet, New-York, October 15.

This is a sort of bolting machine, in which the feathers are to be stirred and beaten about, and the dust separated from them. A long trough is made, the upper part of which is of leather, formed and supported like a wagon tilt; at the lower part is a drawer, covered with wire grating, to receive the dust. A frame, like that of a bolter without its cloth, is made to revolve within the trough by means of a crank; from this frame small pieces of wood, or sole leather, project, which are to act upon the feathers. The machine is placed in an inclined position; the feathers are put in through a door at the upper end, and when they arrive at the lower, are said to be "perfectly bright, clean, and free from all impurities." There is no claim, the whole machine, therefore, is patented.

24. For a churn called a Box Churn; Thomas and Lansing Morrison, Groton, Tompkins county, New-York, October 16.

A box which may be 18 inches long and 14 wide, or of any other length, width, and depth, is to have a top, bottom, sides, and ends, all put together so as to hold milk or cream; gudgeons are to be fixed on the sides of said box, to one of which a crank must be attached to turn it. The lid must fit so well that the contents may not leak out; a faucet, or cock, is placed to allow the butter milk to run off, and if it will not do so when the box stands horizontally, it may, by means of the crank, be held in a sloping direction, "and the butter will remain in a ball, or balls, in the churn." So endeth the description, and, very wisely, nothing is claimed.

25. For a Harpoon of cast-iron and wrought steel, with a wrought iron shaft; Jonathan Sizer, 2nd, New-London, Connecticut, October 16.

The following is the specification:—

"The head to be of cast-iron, zinck and tin, lead, or copper, so as to give the dart, or harpoon, sufficient strength. The edges, knife, or cutting part, to be either of wrought iron, or cast iron, wrought steel, or cast steel; to be cast or rivetted in the head. The shank, or shaft, to be of wrought iron, wrought steel, or copper. The shaft, or shank, to be cast into, or firmly rivetted, on the head of the harpoon, and fixed therein strong and solid."

Of what materials our whalers will hereafter make their harpoons, we wot not, as nearly all, excepting the precious metals, are now patented. It is not the form of this harpoon that is new, but the old materials. We may expect to hear of a jubilee among the finny tribe, when they learn that they are not to be harpooned, either with iron, or steel, wrought or cast, zinck, tin, lead, or copper, excepting by permission of J. S. 2nd.

26. For an improved mode of Tightening Doors and Windows; Stephen Hayward, Plainfield, Hampshire county, Massachusetts, October 17.

A fender is to be fixed by hinges at the bottom of outer doors; on the door sill, near the hinge side, a piece of iron is fixed to raise the fender as the door opens; strips are to be fixed in the rebate, or groove, of doors and windows, and to be borne up against their edges by spiral or other springs. We do not think it worth while to be more particular in describing this contrivance, and shall, therefore, only add the claim of the patentee.

"What I claim as new, and as my own invention, is the manner of raising and confining down the fender at the bottom of the door; also the pieces in the casing borne by springs against the face of the door; also bearing the slides in windows, against the sash, to keep the sash tight, and hold it when raised.

27. For a Churn; James C. Barrett, Collins, Erie county, New-York, October 19.

This is the most formidable churn which, to the best of our recollection, we have ever encountered. A very strong frame is made, upon which there are to be raised two fender posts, from 4 to 5 feet high, from 2 to 3 feet wide, and from 2 to 3 inches thick, for a common churn, but larger for those which are of extraordinary size. Within these fender posts are three cog wheels of 2 feet 6 inches, and 2 feet diameter respectively, and four pinions of 8 inches diameter each. The first pinion is to be acted upon by the moving power, the last is to give motion to the dashers of a churn, the intervening wheels and pinions gearing into each other, *secundum artem*.

The moving power is a heavy vertical rack, working up and down in a groove, and when in gear, taking into the first, or upper pinion.

"This vertical rack is about 10 feet long, and from 2 to 6 inches square, more or less, as may be required; and the teeth from top to bottom of said rack may be made of cast or wrought iron, or may be wooden pins, and be so adapted as to work into the wheels and pinions." This rack is to be wound up by a crank, and by its weight is to set the whole train at work, and of consequence churn the butter at the end of it.

"What I claim is the peculiar arrangement of the apparatus above described, with the heavy descending rack employed as the moving power."

28. For an improvement in the Knob Lock; James Patterson, Birmingham, St. Clair township, Alleghany county, Pennsylvania, October 19.

The latch, or spring bolt, of this lock, is forced forward by a spiral spring instead of the kind of spring ordinarily employed; this is all that is claimed. In spring catches for round tea tables and candle stands, such springs have been used upon the tail of the bolt, for forty years at least, nor are they new in locks; they have before been patented in the United States, and it is to be doubted whether the claim was then good.

29. For an improvement in the Application of Hydraulick Power; Zebulon and Austin Parker, Coshocton county, Ohio, October 19.

The patentees claim to have invented improved methods of using water, by "combining percussion with reaction, applied and exemplified in,

"1. A compound vertical percussion and reaction water wheel for saw mills and other purposes, with the method of applying the water on the same.

"2. An improved horizontal reaction water wheel, with the method of combining percussion with reaction in it.

"3. A method of combining percussion with reaction on common reaction wheels, or those already in use."

After describing the particular manner in which

they construct their wheels, the patentees say, "the parts of the above described machinery claimed as original, are as follows: 1. The compound vertical percussion and reaction wheel for saw mills and other purposes, with two, four, six, or more wheels on one horizontal shaft; the concentrick cylinders enclosing the shaft, with the manner of supporting them; the spouts which conduct the water into the wheels, from the penstock, with their spiral terminations between the cylinders. 2. The improvement in the reaction wheel by making the buckets as thin at both ends as they can safely be made, and the rim no wider than sufficient to cover them; the inner concentrick cylinder; the spout that directs the water into the wheel; and the spiral termination of the spout between the cylinders. 3. The rim and blocks, or planks, that form the apertures into the wheel, and the manner of forming the apertures. The conical covering on the blocks, with the cylinder, or box, in which the shaft runs; and the hollow, or box gate, in any form, either cylindrical, square, rectangular, or irregular."

It will be seen from the foregoing, that there is considerable complexity in the apparatus patented; and it may be collected, that the plan proposed consists, mainly, of enclosed wheels, with curved buckets, and certain spiral convolutions in the openings through which the water is to act. It is, in fact, a modification of the principles of Barker's and the tub wheel. The patentees state that they have, with great advantage, put their plan into operation. We apprehend that if this be the fact, the mills with which they have made a comparison are not such as are constructed upon the best principles for economizing water. The ordinary tub wheel is recommended by its simplicity, where water is abundant, but where it is necessary to save water, and it can be applied to an overshot, pitch-back, or breast wheel, we despair of seeing it more efficiently employed; these, it is true, may be, and generally are, badly constructed, or improperly geared; but where their velocity is duly regulated, their buckets properly formed, and the water delivered upon them at as great a height as possible, its whole effect, which is due to its gravity, will be obtained. In practice, Barker's mill has been abandoned.

30. For an improvement in the manner of Inking Types, Stereotype Plates, Wood Cuts, etc. by means of an apparatus denominated the "Gravitating Inking Roller Apparatus;" William J. Stone, Washington, D. C. October 20.

The roller by which the types are to be inked, is to be made of the usual composition, or an improved roller is to be formed by interposing a layer of some substance impervious to oil, between the blankets which give elasticity to the roller, and the leather with which it is covered. The ink is to be contained in a trough and supplied to the elastick roller by one of iron, in the same way in which it is usually supplied in power presses. The mode of spreading the ink, so as to equalize it, is new. This is effected by two rollers working against the inking roller; these are called equalizing rollers. They have a fillet, or thread, extending from end to end, like a square threaded screw, and operating as right and left handed screws, force the ink in reversed directions.

The inking is effected by a motion communicated to the apparatus by the traversing motion of the bed and form, and takes place whilst the printed sheet is removed and replaced. A rack, or other similar contrivance is placed under the bed, and geared to the inking apparatus. The bed is allowed to acquire a certain degree of momentum before it engages the rack with the wheel, or pinion, so that but little extra resistance is felt by the pressman. There is an iron frame, or rail-way, which works upon pivots, so as to be inclined either towards, or from the form to be inked. Upon this rail-way, an iron roller runs backwards and forwards, according to the inclination of the frame which guides it. From this iron roller, arms extend to the inking roller, which is made to traverse over the form by the gravity of the iron roller. The mode of tilting the frame, or rail-way, may be effected in various ways, and is not, therefore, intended to be confined to the one adopted.

The points claimed, are, the carrying the inking roller forwards and backwards over the form by the descent of a gravitating body, like the iron roller described, by reversing the inclination of the bars upon which it runs; the communication of motion from the bed to the inking roller, either by a rack, or other gearing; the allowing the bed to acquire momentum before it acts upon the rollers; the use of a stratum, or layer, impervious to oil, as above noticed; and to the mode of equalizing the ink.

31. For a Floating Saw Mill, John C. Ely, New-York, October 21.

"Construct a saw mill in the most approved manner; place it on a scow, boat, or any other floating vessel, of sufficient strength and buoyancy. Make two paddle wheels, connected by an axle, one on each side of the boat; put a steam engine on board this vessel; let it be so geared as to move the paddle wheels, as well as to drive the saw mill.

"It of course saves all the expenses of erecting dams, and conveying the timber to saw mills, as the floating saw-mill can be moved to the most convenient places on the river for business."

32. For a Washing Machine; Henry Shively, Robert S. M'Euen, and John Lindsey, Fredericksburgh, Wayne county, Ohio, October 21.

To arrive at once at the merits of this machine, we shall leap over the *descriptive* part, and attend to the *application*, which is in these words: "before commencing to wash, the *operator*, with the fluted roller, is thrown up out of the box, the clothes thrown in, and spread on the fluted bottom, and the fluted roller brought down upon them by the operator, and the operation of washing commences by moving the fluted roller backwards and forwards over the clothes by means of the operator." The *operator* is the name given to the part which is to be pushed backwards and forwards.

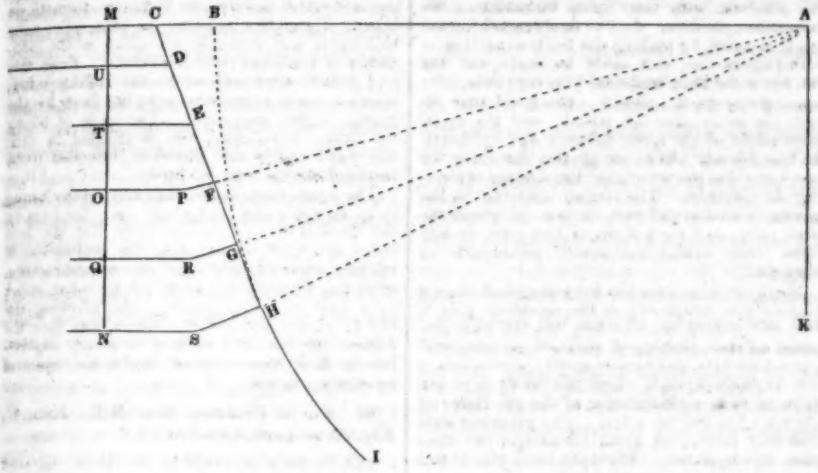
33. For a plough; Reuben Reeder and Stephen D. Ashley, Hamilton county, Ohio, October 10.

Every part of this plough is to be made of iron, with the exception of the handles, and these may be so made, if thought proper; its general form differs but little from that of other ploughs, and in what its particular merit lies, we are not told, and cannot tell, as there is no claim.

COMMUNICATION.] [FOR THE MAGAZINE.

MR. EDITOR—As your Magazine is devoted to the promotion of useful knowledge, we take the liberty of proposing a mathematical question to some of your correspondents for solution.

QUESTION: To make a geometrical construction so as to find, without the aid of trigonometry, the perpendicular distances of the points D, E, F, G, H, from the lines C A, A K.



The line C H, is a tangent to the curve B H I, at the point H, and A H=A B, is the radius.

A B=60 feet.	M B=27 inches.	M U=13 inches.
U T=25 inches.	T O=25 "	O Q=23¾ "
Q N=24½ "	O P=Q R=21 "	N S=20 "

X Y

ENCOURAGEMENT OF

USEFUL INVENTIONS.

Just at the close of the late session of the legislature of Massachusetts, a resolve came from the senate, authorizing "the payment for one year, of the sum of six hundred dollars to the trustees of the Massachusetts Agricultural Society, for the use of the botanical garden in Cambridge;" and as there had been previously, numerous liberal grants made by the legislature, to the agricultural interest in the commonwealth, and as but little, if any, patronage had ever been afforded by the state, to the mechanical arts, a member of the house, one of the conductors of this publication, deemed it a suitable opportunity to draw the attention of the legislature to this long neglected subject; and for this purpose, introduced an order, which went to the same committee to whom the resolve from the senate was referred, viz: Messrs. Gray, of Boston, Metcalf, of Hopkinton, and Hutchinson, of Pepperell; by whom the following report was made:

COMMONWEALTH OF MASSACHUSETTS, } HOUSE OF REPRESENTATIVES, March 8, 1830.

The committee of this House, to whom was referred an order instructing them to inquire what measures can be adopted for the encouragement of useful inventions and the mechanick arts, ask leave to report, that the importance of the mechanical sciences to the general welfare of this commonwealth is, in their opinion, self-evident; and that the duty of the legislature to encourage those sciences, appears to be equally unquestionable. They regret, therefore, that at this period of the session, no measure can be introduced for this purpose in a form sufficiently mature to receive the sanction of the legislature, and they recommend, that the order in question be referred to the next session of the general court, in the full confidence that the whole subject will receive, at an early day, the attention to which

it is entitled, from its great and manifest importance.

All which is respectfully submittted.

(Signed) J. C. GRAY, *per order.*

Between this and the next session of the legislature, we hope that the hint of the committee will be taken, and that such measures will be digested, prepared, and presented to a committee of that body, as shall meet its sanction, and be successful in its passage; out of which, we think some of the most salutary results will be produced. We invite the attention of our patrons, or any others favourable to the promotion of *useful inventions and the mechanick arts*, to furnish us with some views in furtherance of the object proposed, by the suggestion of some plan, first for the preparing a bill, and secondly, to point out such professions of the mechanick arts as are susceptible of specimens of workmanship, with the necessary specifications of each branch; together with such remarks as a little reflection upon these interesting subjects would very naturally lead the mind.

COMMUNICATION.] [FOR THE MAGAZINE.

MR. EDITOR,—I have taken some pains to collect a list of all the patents which have been issued for many years back, and have consulted all the Encyclopedias, and all the works upon mechanicks which I have been able to lay hands upon, in order to discover some comments or treatises upon some machinery which is now, and almost always has been, in daily use amongst all civilized people.

As this machinery will, in all probability, continue to be in use as long as society remains under its present organization, it is a great desideratum to render it as plain and simple as possible. Alterations are made in it in different parts of the country, and experiments tried with it by the operatives employed in superintending it, with such frequency, and in such multitudes and varieties, that it is difficult now, not only to trace its resemblance to its original form and nature of proceeding, but it is even the work of great ingenuity to pronounce upon any identity of principle or operation in any two specimens of modern times.

I fancy, sir, that I have discovered that a great improvement may be made in this machine; and as I have never heard of any patent being granted for any thing similar to my improvement, I shall beg leave to decline, for the present, any mention of it in a way that may lead to competition.

I may, however, safely state that this machinery, though not exactly patented, is yet very nearly akin to a monopoly, and has been the cause of more trouble in the patent office, and has hindered and disappointed as many patentees as all the other machines there, taken together.

I anticipate much opposition to my improvement, because I understand that any machinery which simplifies labour, and saves time, has the tendency of throwing the operatives out of employment; and that the benefit conferred upon society is counterbalanced by the consequent detriment to those who depended, for their subsistence, upon the previously existing incumbrances. I do not like the principle of that objection; nor do I think it would apply in this case. For although the operatives, upon whose labour this improvement might be expected to make a deep encroachment, are a numerous, and, indeed, an influential body, yet, the native sagacity of our fellow citizens is so great, and the peculiar versatility of this particular class, is so available, that as long as there is a community, there is no danger of its not yielding them a support in one mode or another.

Some, however, are bold enough to say that my improvement will not reduce the number of operatives. But, that in consequence of the community being furnished with a good article instead of the bad one, which they are now obliged to use, and a cheap article instead of the extravagant one which they now are obliged to pay for, will consume three or four fold the quantity that they have hitherto found adequate.

The article produced by this machinery is complained of by all classes. The manufacturers themselves, when called upon to introduce improvements, are alarmed at the idea of altering the machinery for the worse. Yet, good judges say that the price of the article is a secondary consideration, for the people must have it, and if they can get it easy and of good quality, they can afford to pay what it is worth. Judges, however, acknowledge that the great expense of the article is now owing to bad machinery, and to the expense of putting the fabrick into an available shape, rather than to the dearness of the raw material.

Under the present system, I have no doubt that I am within bounds, when I say that ten wheels are used where one would

suffice; that it requires ten times as much water, or steam, or horse power, as is in fact necessary to produce an equal result. Again, in every stage and branch of this ten fold apparatus, there is, at least, double the friction that is necessary. The progress, therefore, is excessively tedious and dilatory; and those who engage the fabrick to be made to order, frequently repent that they ever undertook the business. Another disadvantage and great annoyance, is the continual oiling which is necessary; every cam, cog, pivot, and channel, must be kept oiled the whole time without interruption, or else, in the midst of the operation, the whole apparatus comes to a stop, or at best, drags on with a snail-like force, more tedious than before.

A still more surprizing piece of negligence is the general want of balance wheels in this machinery, so that it is not enough to set it in motion, and let it work itself, but you must be at the expense of hiring a man to watch it all the time, and give it a shove at every rise and fall.

I have not yet fully matured my plans, Mr. Editor; but I intend, if I meet with suitable encouragement, to take measures for getting up a company to manufacture this fabrick, which is a most necessary one for the community, upon machinery of entirely new principles, and to furnish it to consumers at as low a rate as they now obtain it, and of a better quality and in one half the time. I will mention to you in confidence the name of the machine and fabrick, but you must be careful not to permit the printer, through oversight, to incorporate it with the foregoing part of my letter. The fabrick is "Justice;" the machinery is the "Law;" who the operatives are, I leave you to guess.

Your humble servant,

ARKWRIGHT.

COMMUNICATION.] [FOR THE JOURNAL.

RAILWAYS AND CANALS.

MR. EDITOR,—In the present state of feeling and general excitement in relation to rail-roads, I have supposed that information as to the various measures for internal improvement accomplished, and now accomplishing, in the different states, and also in Europe, would be alike acceptable to all your readers, whether friends or opponents to projects of this description, now in agitation in Massachusetts.

Theory and speculation we have in abundance, and as is generally the fact, apparently very satisfactory. But the sober thinking, characteristick of our yeomanry, demands something more than plausible hypothesis. Before they can consent to invest millions in any kind of speculation, they must have that sort of evidence which comes by seeing, weighing, and handling, for themselves.

Hopes were entertained by the friends of the rail-road system, and I apprehend, by a majority of the opponents, that the legislature would not have risen before its sanction had been given to some measure which should afford that kind of practical demonstration which would enable a future legislature to act more understandingly upon this great question.

Perhaps, however, that has been done. Perhaps, some of those who have obtained charters will make a beginning. I hope all of them will. If any of them do this, we shall have what I presume will be admitted to be a satisfactory demonstration of the correctness or incorrectness of the directors estimate of cost. If a few miles of the road should be finished during the coming summer, we may all be permitted to see, in a way that admits of no delusion or mistake, what is the actual expense, per mile, of transporting a ton of goods upon a rail-way; with what speed passengers may be conveyed, both by horse and steam power, together with the actual expense, per mile, of propelling locomotive engines. All this kind of information, whether the rail-road project be a good or bad one, is, at the present moment, of incalculable value.

Partly with a view of presenting a substitute for this kind of data; partly of communicating such kind of matter as may be interesting to your readers, and partly to obtain more correct views and more official information myself, I am induced to offer for insertion in your useful periodical, as particular and correct, an account as I have been able to obtain, of all the different canals and rail-roads in the United States; at the same time indulging a hope that any of your readers who are in possession of additional, or more correct information, on the interesting subject, will not withhold it.

MAINE.—Oxford canal, leading from Portland to Sebago pond, about 30 miles in length, is expected to go into operation early this season. This canal, together with the pond and its tributaries, will afford an excellent water communication from Portland more than fifty miles into the in-

teriour of Maine, and bring that thriving town, for commercial purposes, fifty miles nearer to the northern parts of New-Hampshire and Vermont, for the trade of which state, Portland has for several years, been maintaining an increasingly successful competition with Portsmouth and Boston.

A canal has also been proposed, some surveys made, and the situation found to be favourable for its construction, uniting the waters of the Kennebeck and Androscoggin rivers.

NEW-HAMPSHIRE.—Excepting the Bow canal, 4 miles below Concord, the Hooksett, the Amoskeig, the Union canals and one other short Canal constructed some years since for the accommodation of river boats, so far as I can learn, no movement has been made or thought of in that state in relation to either rail-roads or canals; but, I doubt not, ere long this subject will assume its due consequence, and the immense importance to the future prosperity of that state, of a well constructed rail-road through the valley of the Merrimack, running as it does through the centre of the wealthiest part of that state, from Connecticut river, through Lowell to Boston, will be seen and felt by a vast majority of her citizens.

VERMONT.—Shut out, as this state is, from the ocean and from the advantages and facilities of foreign commerce, such measures for internal improvement as may open easier and better facilities through which her produce may reach a profitable market, are necessarily viewed with deep interest by her citizens. She must, however, necessarily stand still until measures adopted by other states, shall show her what to do, and which way to move. And the spirit recently manifested among her intelligent population proves that she is waiting somewhat impatiently. The Champlain canal has opened to the western part of Vermont a market, but it is such an one, as she is now fully aware, is far less valuable than she may have. All her staple commodities are worth less in Albany than in Boston by at least the whole amount of transportation and insurance from one place to the other. This, upon wood, (one of her greatest staples) is fifteen or twenty dollars per ton. Massachusetts is rapidly becoming a manufacturing state, and nothing is more obvious than that the beef, pork, butter, cheese and wood, of Vermont, will find its best market here.

A survey has, I believe, been made for a canal from Middlebury to Burlington, and some other routes for canals have been contemplated. But all these measures and plans are now giving way to a more engrossing and, undoubtedly, much more important one, of a rail-road from lake Champlain, by the way of Onion river and White river, to the Connecticut, and thence, either by the way of Brattleborough and Miller's river, or through the valley of the Merrimack by the way of Lowell to Boston. Should a rail-road be constructed from lake Champlain to Ogdensburgh, as is now seriously contemplated, the measure, taken as a whole, will be of incalculable advantage to Vermont. Passengers from the sea-board at Boston, destined for the shores of lake Ontario, and all the country west of that, would find this their cheapest and speediest route; and goods from the northern parts of Pennsylvania and Ohio, from Michigan and Upper Canada, could, through the Welland canal, by this route, reach the ocean at Boston, cheaper than by the present mode of conveyance to New-York. Distance from ship waters on lake Ontario to Boston, 343 miles; from same to Albany, 363; to New-York, 513.

MASSACHUSETTS.—Middlesex canal extends from Boston to Chelmsford; 27½ miles long; 20 locks; 136 feet of lockage; 30 feet wide; 4 feet deep; cost about $19,000 per mile; income from tolls, about $20,000 per annum.

Blackstone Canal, connects Providence with Worcester; 45 miles long; 450 feet of lockage; and cost about $13,000 per mile. The anticipations of the projectors of this enterprize, as to its income, have not been realized. The facts that Providence itself is thirty miles from the ocean, and its commerce, for a part of the year, entirely obstructed by ice, seem to have been overlooked. I suppose it is an undoubted fact, that the staple products of the interiour of Massachusetts, on an average the year round, are worth more in Boston than Providence, and that this difference of value, amounts to a sum, equal at least, to the entire cost of conveyance on a rail-road from Worcester to Boston.

South Hadley Canal, overcomes the rapids between stony brook and Chickopee river, amounting to a fall of about 40 feet. Two miles in length. There is a cut in this canal, 40 feet deep, and 300 feet long, in solid rock.

Montague Canal, surmounts the rapids which commence above the mouth of Miller's river, and terminates above the mouth

of Deerfield river; 3 miles long; 25 feet wide, and 3 feet deep; overcomes a fall of 65 feet; 75 feet lockage.

PAWTUCKET CANAL, passes round the Pawtucket falls in Lowell, and answers the double purpose of navigation and conveying water for the manufactories; 1½ miles in length; 90 feet wide, and 4 deep. Another small canal extends from this to the Merrimack.

QUINCY RAIL-ROAD.—This road has been in operation three years. The usual load for one horse is ten tons, moving three miles an hour. It is three miles long, and cost $11,000 per mile.

Should you think it worth while to give this an insertion, it is my intention to pursue the subject and give a sketch of similar undertakings in other parts of the United States.

MIDDLESEX.

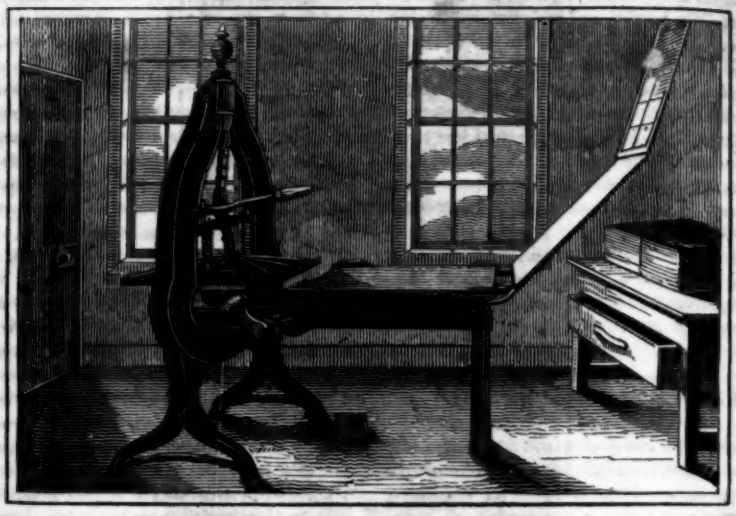
PRINTING PRESSES:

IMPROVEMENTS IN THEM.

Within the last few years many and important improvements have been made in this machine. It is astonishing to behold the varietiy of forms, given by human ingenuity, to this important article. What would the inventor of the original printing press think, were he permitted to return to this world of inventions? and, instead of the old fashioned, square-rigged, wooden press, made up of the *cheeks, cap, winter, head, till, hose, garter, hooks, spindle, worm, nut, eye of the spindle, shank of the spindle, toe of the spindle, hind-posts, hind-rails, coffin, plank, gallows, etc. etc.* behold all these, resolved into the simple iron frame, progressive levers, and iron table of the modern printing press? Would he not doubt the correctness of his vision, and conclude that what he beheld was only a succession of the mysteries that continually pass before him? But, to leave our speculation, and return to the subject in hand:—we are told that a Mr. Dodge, of this state, first conceived the plan of applying progressive levers, or toggle-joints, to manual printing presses. His first application of it, no doubt, was a rude one; but he laid a foundation, upon which subsequent improvements have accumulated to a vast extent; so great that we shall not undertake to enumerate them. Mr. Phinehas Dow, of this city, has, we think, been very successful in applying these progressive levers. He has contrived to place the fulcrum of the lever on the near side, thus bringing the bar-handle nearer to the pressman, and also the advantage of not extending an awkward distance out from the press. Mr. D., however, is not alone in this particular, others, have appended the bar to the near side of their presses, also; but, whether they have done it in so compact a manner admits of considerable doubt. For ourselves, we can say we never saw a press fold up so snugly, (if we may be allowed the term,) as that of Mr. D. But, its most striking feature is its simplicity; we believe it would be impossible to construct a press with less machinery. The bar or lever, is 36 inches long, from the extreme end to the centre of motion; from this centre, and at a right angle with the bar, is a short arm, to which a pitman is attached; the short arm is 2¼ inches long, and extends towards the back of the press; the pitman terminates in a ball, which acts in a socket near the top of the lower toggle; of course the toggles are pushed, and not drawn, as in other presses. Those parts giving the pressure are brought in straight lines at the greatest stress, consequently no spring, and but little friction, are important advantages in this press.

Perhaps it would not be amiss here to observe, that the frames of both presses (Mr. Dow's and Mr. Clymer's) are of cast iron, and indeed, the iron frame is adopted in almost all modern improvements.

To give our readers a fair idea of this press, and at the same time present them with an eye-view of the march of improvement, we have, at pp. 88 and 89, contrasted it (in perspective) with that of Mr. George Clymer, of Philadelphia. Mr. Clymer's press, in its day, was considered an acquisition to a printing office, and no doubt it was; but, far otherwise is the case at present. In the perspective, the eye is struck with rather an agreeable picture; but, as beauty is not always indicative of superiour worth, so with this press; it may be classed with the *beautiful*, but not among the *useful*. The views we give of these presses will illustrate the simplicity of the one, and the complexness of the other. It is well known that a simple, and yet efficient, machine, always possesses decided advantages over a complicated one; this being the case, the reader may draw his conclusions from the representations before him. But, exclusive of its intricateness, we have other objections to Mr. Clymer's press. Such as its liability to accident, because of its overmuch machinery; and, (what we think a serious one,) the movement of the platen; in the perspective the platen is seen attached to the main lever by means



of a piston, which piston slides between two projections from either of the inner sides of the press; these projections are grooved at the ends, and are intended to guide the piston in its perpendicular motion, but of this they fail; for the piston being made fast, as above stated, to the main lever, and this lever rising only at one end, (the other being secured to the near side of the press,) does not, of course, give an accurate perpendicular movement to the platen, the consequence of which is, that a clear impression is not easily obtained.

In speaking thus freely of Mr. Clymer's press, we do not wish to be understood as being inimical to that gentleman; we wish to be understood in our true light, viz: the recording the Inventions, Improvements and Discoveries of the age. In doing which we feel it an imperious duty to give to each particular machine, coming under our observation, its due proportion of merit, even

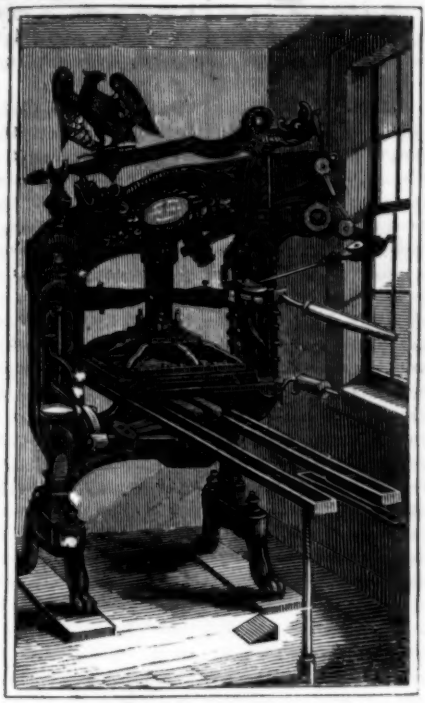
COMMUNICATION.] [FOR THE MAGAZINE.

FOUNDATIONS.

Mr. Editor,—You will find no lack of contributors to your useful Magazine, of that class who deal in the science of mechanicks; but the more humble and practical walks, present less attractions, and are more likely to be neglected. It is, however, from the simplest elements, that the most complicated machines are composed; and the most profound science, is but a happy combination of simple truths. It shall be, therefore, my humble task to serve up, occasionally, to your festival, some little *entremet*, as plain and as palatable as I can make it.

I cannot choose a better subject to begin with, than *foundations*. And if the moral foundation of my enterprize be such as every physical one should be, my superstructure will be the better for it.

There can be no invariable rule for foundations; they must be governed by the nature of the soil, and other circumstances. The loosest sand may be a good foundation, and the firmest clay may be a bad one. The sand at a certain depth beneath the surface, and confined by clay, or by an incumbent pressure of the earth all around the edifice, provided that pressure be not over balanced by the pressure of the



if derogating from some less happy discovery.

We wish Mr. Dow success in his improvement. He has, he thinks, arrived at the *ne plus ultra* of this machine; we were almost ready to go along with him, in this respect, and would no doubt, were it not that something new was "being" brought to light almost every day; the Preacher to the contrary notwithstanding. For since writing the above we have been called to view another, and still another improvement in the printing press!! The first is a manual printing press, to be worked by the foot! The second a double power press, throwing off 18 sheets per minute. We are promised something for a future number concerning these, and therefore we leave them for the present.

The press, which called forth these remarks, may be seen at the office of the Magazine; it is of an imperial size, and very highly finished. The page before you is a sample of its work.

edifice, will be a perfect foundation. In driving the piles for the foundation of a lofty building at Wheeler's Point, some years ago, the workmen informed me that they could go no deeper; the hammer rebounded from the head of the pile; they supposed they had come on a rock. I had occasion to bore, some time after, on the same bottom, and found, at the same depth, a continuous stratum of sand, under one of clay. Water, would be equally as impenetrable to the pile, if it were confined and could not escape.

Hard clay is a good foundation, so long as it is kept dry, and is not loaded by a superstructure of weight, sufficient to produce abrasion and displacement, which is difficult, when it is supported by a little lateral pressure, much less than is necessary for sand.

The depth and the breadth of foundations, it would appear then, should be governed by the foregoing, and similar circumstances; that is, the weight of the building, and the adhesiveness, and the position of the earth. It may be said that these are truisms, known to every mason, practically. It is true, that they are too frequently neglected, as we may know by occular demonstration, in publick as well as private works. Possibly,

every mason, has not given his attention to this balance of action and reaction, or reflected on the importance of laying foundations deeper or wider in one circumstance than in another.

I have mentioned the width of foundations. It may be proper to explain my meaning. It will not be extravagant to say, that the heaviest monument may be erected on the softest foundation, even on water, if that foundation be wide enough. Therefore, on all doubtful ground, or in places where it is too costly and difficult to dig deep, the foundation should be extended with large stones, considerably beyond the plumb line of pressure. I would, in all buildings of much elevation, extend the four corners of the foundation beyond the plumb of the walls, in proportion to the elevation. The four corners being well secured, make so many natural arches of the intervening walls, in case any part of the same should be removed. The ancient ceremony of laying the corner stone, was not formerly a mere pageant, the occasion of a sacrifice, a libation, or a prayer; it was a ceremony, the importance of which, is to be read in the indestructible works of antiquity, which are arguments not to be resisted, and going to show, that this part of the work, was particularly worthy of the most scrupulous attention of the craft; and it was accordingly done in the most publick manner, with many imposing ceremonies. It was not one corner alone, which was the object of all this solicitude, but the four corners. I will not require, however, of the spectators of this interesting ceremony to remain during the laying of the whole foundation; but I would recommend to the owner, to see, not only the four corners laid, but several intervening points, at least, of the four sides; these points being well laid, on a sure and solid bottom, may secure the whole edifice.

When the first preparations were making for the Bunker Hill monument, I walked over the ground with a gentleman of this city; and was speaking of the defective foundations of the west side of the state prison, and of the new court-house; and expressed a hope, that such an errour might not be committed in erecting a monument, destined to carry down to distant ages, the eventful tragedy of a day. When arrived at the eminence, I observed, with surprize, that the excavation was but about six or eight feet deep, and some small stones were about being laid therein for a foundation. I went home, full of concern, and sat down and wrote a small article for one of the papers, remarking on the insufficiency of such a foundation; and I believe I gave the dimensions of the foundation of the column of Austerlitz, in Paris. I had the pleasure to see some time after, a foundation for the monument that will not fail.

The state, some time since, had occasion to erect a stone wall, to retain the grounds east of the state house. The work was so imperfectly done as to excite observation; I remarked on it to the present mayor, who was not then in office, and predicted its fall in one winter; and to prevent the loss, if possible, I sent a short notice to that effect, to the paper, the Palladium, I think. The wall fell within the time, but it has been replaced by a structure that does credit to the architect. If I may be allowed, however, to be a little fastidious in recommending a close adherence to the philosophy of the art, I would say, there was a little errour there, on the right side to be sure. There is a well known force requisite for the support of a bank of earth, viz: a force equal to resist the weight of a prism of earth, composed of an equal section of the mass, cut diagonally, deducting the friction of the hypothenuse. Much must be allowed for the power of the cuneiform, or wedgelike shape of the movable section of earth, especially if the water be allowed to penetrate. The under section, or remainder of the bank, will stand at forty-five degrees without support. The new wall was, perhaps, a little too well done. Now since I am on the tone of criticism, I hope it may not be thought insidious to remark on an errour of excess (as it seems to me) in the superstructure of Bunker Hill monument, since the money is so hard to be obtained to finish that work. I am a subscriber to that enterprize, and as I have never shared any of the honours, or the labours, I will contribute my additional mite in this way; and if it save but a dollar, I shall be satisfied. I observed last year that the stones composing this monument, were clamped together, frequently, with heavy iron. It appeared to me a superfluous expense. Imagine for a moment, one single rough hammered, granite stone, weighing five or six tons, laid on another stone, equally rough. What power would it require to move the upper stone horizontally? Now suppose such stones, about six feet long and three or four broad, breaking joints, and well laid, as they are, and then confined

by an incumbent pressure of two hundred feet of stone-work; what power can we imagine that would be able to remove stones so confined by weight, friction and adhesion? The power that could produce such an effect, would find, in the resistance of the iron clamps, a check, not superiour to that of a cob web. Excess is a fault every where; and in those arts or sciences which are subject to mathematical precision, it must be attributed to ignorance or inattention. Judicious economy, is the soul of the mechanick arts, and should be always kept in view.

The foundations under water, those of our wharves for example, are less subject to precise calculations; hence, the numerous failures in that respect in this city. But it would seem, that after so much experience, and so much waste of money and labour, something nearer to accuracy might have been attained. More than a dozen successive failures have been experienced in building wharves within as many years. I cannot believe that the evil is without a remedy. * * * * * *.

COMMUNICATION.] [FOR THE MAGAZINE.

Mr. Editor,—I transmit you for publication, the following copy of a letter from Count Rumford, dated London, July 12, 1796, to the late Hon. John Adams, then president of the A. A. A. S., on a highly interesting subject; and also the copy of a vote passed by the society upon the receipt of said communication. It is understood that no discovery or improvement has been made to entitle any one to the premium. The principal must now be something like 18 to $20,000; the biennial interest on which, considered in a single premium, is believed to be the largest ever offered in this country; and one would suppose, must elicit attention among those who it is presumed are pursuing the studies of the sciences or the arts. Can it be, as has been once asked before, that the existence of the premium is nearly unknown? And has so much time as thirty-three years elapsed without any important discovery or useful improvement having been made on heat and light in the American continent or islands? Possibly the requirement, that the discovery must be made "during the preceding two years," has operated as a bar to a successful claimant, where otherwise, the premium would have been obtained. Should there be any misapprehension on this subject, there are those who can set me right, and which is desirable to have done, if not correct. The only object of the writer will have been obtained in bringing the subject before the publick; in doing which, he cannot consider himself as trespassing upon the duty of others at all; upon those, for instance, who are honoured with the responsibility of the trust committed to them, and who doubtless can have no objection to have the subject, under consideration, made known for the first time to some, and revived in the recollection of others throughout the country.

O.

"To the Hon. John Adams, President of the American Academy of Arts and Sciences.

Sir,—Desirous of contributing efficaciously to the advancement of a branch of science which has long employed my attention, and which appears to me to be of the highest importance to mankind, and wishing at the same time, to leave a lasting testimony of my respect for the American Academy of Arts and Sciences, I take the liberty to request that the Academy would do me the honour to accept of five thousand dollars, three per cent. stock, in the funds of the United States of North America, which stock I have actually purchased, and which I beg leave to transfer to the Fellows of the Academy, to the end that the interest of the same may be by them, and by their successors, received from time to time, for ever, and the amount of the same applied and given, once every second year, as a premium, to the author of the most important discovery, or useful improvement, which shall be made and published by printing, or in any way made known to the publick, in any part of the continent of America, or in any of the American islands, during the preceding two years, on Heat, or on Light; the preference always being given to such discoveries as shall, in the opinion of the Academy, tend most to promote the good of mankind.

With regard to the formalities to be observed by the Academy in their decisions upon the comparative merits of those discoveries, which, in the opinion of the Academy, may entitle their authors to be considered as competitors for this biennial premium, the Academy will be pleased to adopt such regulations, as they, in their wisdom, may judge to be proper and necessary. But in regard to the form, in which this premium is conferred, I take the liberty to request that it may always be given in two medals, struck in the same die, the one of gold, and the other of silver, and of such

dimensions, that both of them together may be just equal in intrinsick value, to the amount of the interest of the aforesaid five thousand dollars stock, during two years; that is to say, that they may together be of the value of three hundred dollars.

The Academy will be pleased to order such device or inscription to be engraved on the die they shall cause to be prepared for striking these medals, as they may judge proper.

If during any term of two years, reckoning from the last adjudication, or from the last period for the adjudication of this premium by the Academy, no new discovery or improvement should be made in any part of America, relative to either of the subjects in question, (Heat, or Light,) which in the opinion of the Academy, shall be of sufficient importance to deserve this premium; in that case, it is my desire that the premium may not be given, but that the value of it may be reserved, and, being laid out in the purchase of additional stock in the American funds, may be employed to augment the capital of this premium; and that the interest of the sums by which the capital may from time to time be so augmented, may regularly be given in money, with the two medals, and as an addition to the original premium, at each succeeding adjudication of it. And it is my further particular request that those additions to the value of the premium, arising from its occasional non-adjudications, may be suffered to increase without limitation.

With the highest respect for the American Academy of Arts and Sciences, and the most earnest wishes for their success in their labours for the good of mankind,

I have the honour to be,

With much esteem and regard,

Sir, your most obt. hum. servt.

RUMFORD.

London, July 12th, 1796.

Upon the receipt of the donation, the thanks of the society were presented to Count Rumford in the following terms:

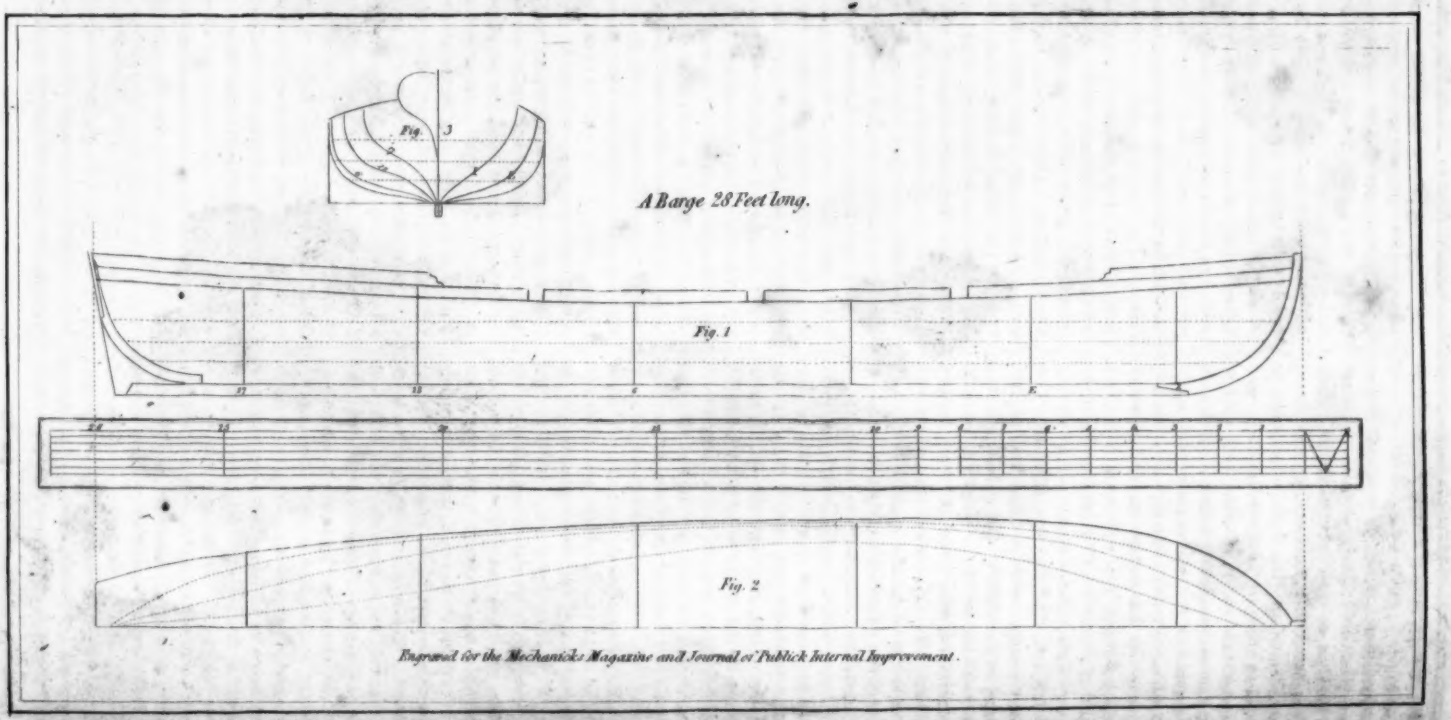
Voted, That the thanks of the Academy be presented to Count Rumford, for his very generous donation, and that they experience the highest satisfaction in receiving this additional and very liberal aid, for the encouragement and extension of those interesting branches of science, which he has specified as the objects of his gratuity, and which *he* has so successfully cultivated: That they entertain a high sense of the sentiments and views, so becoming a philosopher, which have prompted him to this distinguished act of liberality; and in the execution of the grateful office, which they have undertaken, of awarding and distributing the premium which Count Rumford has thus appropriated, they will sacredly comply with the conditions of the donation; indulging the hope, that he will meet his reward, in learning that many in his native country are thereby excited to emulate his labours, and to promote the accomplishment of his beneficent wishes, for the advancement of science, and the augmentation of human happiness."

NAVAL ARCHITECTURE.

The Americans perhaps excel as much in the art of naval architecture as in their mode of navigation. It is not for us to pretend that we have more scientifick, or experienced architects than England and France; countries, where to arrive at the highest degree of perfection in that art, was the object of the warmest emulation and the most extravagant exertions for a century or more before our independence; but we do believe that we have naval architects in America of more practical ability than are to be found in any part of the world, although in science and in experience, we ought, perhaps in justice, to defer to the disciples of the great naval depots in Europe, where all the knowledge that can be derived from study, comparison and an almost innumerable series of examples, has been for years collected, classified, examined and tested by men, who have made that pursuit the sole object of their lives, and who have been led into, and continued in it, by the richest rewards and highest favours of sovereign patronage.

Many will, no doubt, think we concede too much in the above admission. Be that as it may, we conclude that the American ability is more efficient than even the superiour qualifications (if they can be so called) of our trans-Atlantick friends.

The French models are much approved. It is said that nothing can be more beautiful than a French frigate. But the French ships are not considered so strong as the English. Is it not possible that we departed, in some degree, from our English taste in naval architecture soon after the revolutionary war, and partly in consequence of our admiration of the delicate and beautiful French models which were so constantly exhibited before our towns, and



REFERENCES:—Fig. 1, the sheer plan, or horizontal view. Fig. 2, the half-breadth plan, or horizontal view. Fig. 3, the body plan, representing the fore-body on the right-hand side, and the after-body on the left-hand side. The figures 6, 12, 17, and letters A E, describe the same lines in each of the figures.

in our harbours, during a long period of that contest?

Perhaps there is nothing in which beauty is so striking as in a ship. And the contrast between a clumsy, low-masted, black English merchantman—without any head, three divisions in the deck, and bowsprit elevated at angle of forty-five degrees—and a clean, bright-sided, flush deck packet, with figure head and sliding gunters, is perceptible to the most inexperienced eye.

In school-boy days we all knew the elegant ships by name, and on their arrival, Saturday afternoon was always, in part, devoted to *a view*, at least; and if the mate was very kind, there was sure to be a game of *follow me*, all over the rigging. Our desks at school were ornamented (as we thought) with penknife engravings of our favourite ships, in every variety of attitude and manœuvre, and enduring every species of contest with storm and foe. The men of war, as we called the frigates, were rather beyond our experience; but the Reindeer, the Avon, the Rambler, the Jacob Jones, and all the rakish rigged privateers, were as well known to us as our satchels. We mention this only as an instance of the deep impression, and powerful gratification produced in the minds of boys by beautiful models of ships; and we believe that a taste for such objects is easily cultivated, and ought always to accompany the experience and study of the practical naval architect.

If our ship-builders had been bound down to learn their trade out of books alone, without resorting, in any degree, to their own fancy, it is hardly probable that the bold and material alterations of the present day could have superseded the old fashioned models. Notwithstanding these improvements, there is yet, if we are rightly informed, a secret in the art, which no one can solve. We believe it to be a conceded fact, that two ships may be built after the same model with similar materials, may be rigged in the same proportion, and be of the same measurement, and yet vary in sailing and setting in the water, as much as if they were in all respects the opposites of each other.

Our boat-builders have also a high reputation. A beautiful sight indeed, at Whitehall-slip, in New-York, is the number, variety and elegant models of row-boats there exhibited. We profess, also, in this city, to have boat-builders whose ability and skill need not shrink from a comparison with the most successful architects.

One of the most beautiful barges we have ever seen, was built in this city, and by our unfortunate fellow citizen who was so lately twice visited with the affliction of a fire, without, in the last instance, the benefit of any insurance. This barge, of which we obtained the precise dimensions, presented in the plate and accompanied by an accurate scale, was built with particular attention, for an individual in Brazil. The size and proportions will be instantly discovered, by the mechanick, by means of the scale.

The frame and plank of the boat were oak. The thwarts and gratings, and pannel work above the thwarts, mahogany. The moulding on the outside to serve as a fender, solid brass. The staunchions that support the wash-boards, the row-locks, rudder-braces, yoke, tiller, pump, and a plate on the stem and stern, are also brass. Every part of the boat was oiled and varnished, and the wash-boards covered with figures executed in bronze and gold. Mahogany mouldings ornamented the pannel work, and the gratings were gilt. The Brazilian arms were executed in bronze and gold, in the richest style, on the cockswain board. An awning extended ten feet from the stern, ornamented with cords and tassels, and supported by brass pillars. Part of the flooring was carpeted. There were two sets of cushions; one covered with the richest crimson damask, the other, with moreen. She had two brass boat-hooks, one sail and six oars, the ends of which were covered with brass.

Among all the celebrations and diversions with which we regale ourselves on the anniversary of our independence, it is to be wondered that a rowing match, in Boston built boats, has never taken place. We cannot imagine a more innocent amusement than such would be; and if a competition in the accomplishments of good and able oarsmen could be got up among our seamen, the navigating interest would be much benefitted. It is believed that first rate oarsmen are very rarely to be found among sailors, excepting in whaling vessels and in old crews in the government's service.

THE LAW OF 1819, RESPECTING MECHANICK'S LIENS.

We believe that no decision has as yet been published in our books of reports respecting this law; we therefore present it as

REFERENCES:—Fig. 1, the sheer plan, or horizontal view. Fig. 2, the half-breadth plan, or horizontal view. Fig. 3, the body plan, representing the fore-body on the right-hand side, and the after-body on the left-hand side. The figures 6, 12, 17, and letters a e, describe the same lines in each of the figures.

printed in our statute books; remarking, that it is called by the double appellation of the "*Act of* 1819, *chapter* 156;" the "*Act passed February* 24*th*, 1820."

"An act securing to mechanicks and others, payment for their labour, and materials expended in erecting and repairing houses and other buildings, with their appurtenances.

SECT. 1. *Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same*, That when any contract shall hereafter be made in writing, between the proprietor or proprietors of land, on the one part, and any person, or persons, on the other part, for the erecting or repairing any house or other building or their appurtenances, or for furnishing labour or materials, for the purpose aforesaid, the person or persons, who, shall, in pursuance of such contract, have furnished labour or materials for such purpose, shall have a lien to secure the payment of the same upon such building, and the lot of land, on which the same stands, and upon the right of redeeming the same, when the same has been previously conveyed in mortgage: *Provided always*, that no such lien shall attach unless such contracts shall have been recorded in the registry of deeds, in the county in which the land, on which such house or other building has been erected or repaired, lies; and no lien created by this act shall continue in force more than six months from the time when the last instalment shall fall due, by the contract by which such lien shall be claimed, unless a legal process shall have been commenced for the purpose of enforcing such lien.

SECT. 2. *Be it further enacted*, That it shall be the duty of the register of deeds, in the county in which any such land may lie, to record all such contracts for the usual fees; and when a contract shall consist of more than one part, the recording of one part shall be sufficient, and have the same effect as recording the whole.

SECT. 3. *Be it further enacted*, That any person having a lien upon any building and the lot of land on which it stands, as aforesaid, may petition to the judge or justices of the court of Common Pleas, holden in the county in which the land, mentioned in any such contract, may lie, to order a sale of such land, with the appurtenances; in which case the judge or justices of such court shall order notice to be given to all the creditors having a lien, as aforesaid, on such estate, to appear and make out their claims under such contracts; and the owner or owners of such estate, to show cause, if any they have, why a decree, that such estate should be sold, should not be passed, by causing each of them to be served with an attested copy of said petition, and the order of court thereon, fourteen days, at least, before the time assigned for a hearing upon said petition, or by causing an attested copy of such petition and order to be published, at such times, in such newspaper as the court shall direct, the last publication to be at least fourteen days before the time assigned for such hearing; and every such creditor, who does not appear and exhibit his claim to the court, before the sale of such estate shall be decreed, as aforesaid, shall not be entitled to the benefit of such lien. And when it shall be made to appear to the court, before such petition shall be pending, either by the default or confession of the party petitioned against, or by the verdict of a jury, that any sum of money, secured by such contract, had been due and unpaid sixty days at the time of preferring such petition, the court may enter up judgment against the respondent, in favour of each of such lien creditors, for such sum as may be found due to them respectively, and may order the land and appurtenances, in such contract mentioned, to be sold at publick auction, to pay and satisfy the same; saving to the owner, or owners of such estate, the right of redeeming the same, at any time within one year from the time of sale, by paying the purchaser, or any person claiming under him, the sum for which it was sold, with interest, at the rate of twelve per cent.; deducting therefrom, the rents and profits, over and above the necessary repairs. And in the hearing upon any such petition, each of such lien creditors shall have a right to contest the claim of the other by issue to the jury, or otherwise.

SECT. 4. *Be it further enacted*, That whenever the owner of any such estate shall have so failed to perform his contract or contracts, in relation thereto, as aforesaid, that, in the opinion of the court, said estate, according to the true intent and meaning of this act, ought to be sold, as aforesaid, and the person or persons, or any of them, who have so contracted to furnish labour or materials, for erecting or repairing such house or other buildings, and without any default on his, her, or their part, have not fully performed his, her, or their contract, a portion rate of

the sum, stipulated to be paid to such lien contractor, shall be awarded to him, her, or them. And any creditor of the owner of any lot of land, on which an house or other building shall be erected or repaired, by contract, as aforesaid, who shall have caused such lot of land, with the appurtenances, to be attached, to secure the payment of his demand, previously to any such lien creditor entering into, and recording, as aforesaid, his contract for erecting or repairing such house, or other building, or their appurtenances, as aforesaid, shall be preferred to any such contracting creditor, so far as relates to the value of said land, or building, in the state in which they were at the time when the erecting or repairing of such house or building was commenced. And the value of such lot of land, or land and building, at the time when the same shall be attached as aforesaid, shall be ascertained by the appraisal of three disinterested freeholders of the county, in which such land shall lie; one to be appointed by the petitioning creditor or creditors, one by the respondent, and one by the officer who shall make the sale. And in case the respondent neglects or refuses to appoint such appraiser, the appointment of two such appraisers shall be made by such officer.

SECT. 5. *Be it further enacted*, That in all cases, in which the court shall order and decree that any such estate shall be sold, as aforesaid, the sale shall be made by the sheriff or his deputy; and if the sheriff be interested, then by the coroner of the county in which such estate lies; and such notice shall be given of the time and place of sale, as is provided by law, when the right of redeeming real estate is sold, which has been conveyed in mortgage. And whenever it shall be found by the officer who has made such sale, that the net proceeds of such sale are insufficient to satisfy the sums which shall have been awarded to the lien contract creditors, and attaching creditors, according to the provisions of this act, it shall be the duty of such officer, after satisfying this claim of the attaching creditor or creditors, if such there are, to apportion the net proceeds of such sale among the lien creditors, according to the sums to them respectively awarded; and if the net proceeds of the sale of such estate, shall exceed the amount of all the sums ascertained and awarded as aforesaid, it shall be the duty of such officer to pay over the excess to the respondent.

SECT. 6. *Be it further enacted*, That each and every lien creditor, his executors, administrators, or assigns having received payment and satisfaction of his or their demands, according to the terms of such contract; or, when such house or other building shall have been sold, and the proceeds thereof paid over according to the provisions of this act, each and every such lien creditor, his executors, administrators, or assigns, shall enter, upon the margin of the record of such contract, a discharge of his or their lien upon such house or other building, created by such contract, or, by deed duly executed, release the same; and any party in interest shall be entitled to have like remedy for obtaining due discharge of such lien, in case the money shall be paid as aforesaid, as is now by law secured in equity to mortgagers, their heirs, executors, administrators, or assigns.

SECT. 7. *Be it further enacted*, That in all cases arising under this act, every party shall be entitled to a trial by jury, of any matter of fact in the cause; and any one or more of the parties may appeal from the judgment of the court of Common Pleas, to the Supreme Judicial court, as in other cases. [*Feb.* 24, 1820."]

In our next, we shall offer a few remarks upon the subject of this act, which we consider very badly drawn up, and calculated, from its uncertainty, to do much harm.

AMERICAN SILK.

The Precurseur, a paper published at Lyons, in France, mentions that samples of Philadelphia silk have been assayed in that city, with the most favourable results. The assay was made at the request of the Chamber of Commerce; and the following is a notice concerning it; which will naturally interest many of our readers.—(N. Intel.)

"The assay took place recently upon a sample prepared by Mr. d'Homergue, of Nismes, son of Louis d'Homergue, late proprietor of a splendid filature of silk in said town.

It results from the assay, publickly, executed at Lyons, by Pierre Mazel, licensed assayer of silk, that the raw silk obtained in Philadelphia is of an extraordinary quality, and is admirably adapted to all the uses of fabrication; its degree of fineness is 16 dwt. so that it would produce singles of 50 dwts., organzine of 32, and tram or wool silk of 30, a quality of silk extremely rare in our country. American silk is fine, nervous, good, regular, clean, of a fine colour,

and, in a word, it unites all the qualities that can be wished for. Its market price in the state of raw silk, well reeled, according to its different qualities, and well prepared, would be 26 francs a pound, and the sale of it at Lyons would be very easy, particularly if there was a constant supply of bales weighing from 100 to 150 pounds.

The Chamber of Commerce loses no time in publishing information so satisfactory. They ought, more than ever, to excite the Americans to plant mulberry trees and raise silk; a kind of industry that will afford great advantages to both countries, and may, in future, give birth to establishments of various kinds, and be a new source of wealth to the United States."

TOWN MAPS.

"With a view of having a correct map of the state, the legislature of this commonwealth have ordered, that the selectmen of every town shall cause to be made accurate plans of their respective towns, and cause the same to be lodged in the secretary's office, free of expense to the commonwealth, on or before the first day of July, 1832. The resolve requires that the names, courses and magnitude of rivers and streams; roads, publick and private; houses for publick worship, court houses and other publick buildings; the distance of the centre of the town or district from the shire town of the county, and from the metropolis of the commonwealth; bridges; ferries; falls; ponds; shores; harbours; islands; mountains; hills; mills; manufactories, etc., be delineated on the maps upon a scale of one hundred rods to an inch."—(Courier.)

[It is understood that these maps are to be taken upon a scale of one hundred rods to an inch. A better scale would be eighty rods; this being a quarter of a mile, and which would facilitate the calculation in miles. Towns should also have been required to give the bearings and distances of the various boundary lines.—EDITOR.]

A PREMIUM OF $100.

"Architects are informed that the justices of the Inferiour Court of Chatham county, Georgia, will award a premium of one hundred dollars to the author of an approved plan for the building of a court house, in the city of Savannah. Such as may be competitors are requested to forward their drawings with estimates, so as to reach Savannah, on or before the first of May next."

For the particulars, we refer those interested, to the Boston Gazette, of the 19th ultimo.

DESULTORY PARAGRAPHS.

New Machine.—William Healey has invented a machine that will make 250 common flat tenons in one hour by the aid of one man only—It is calculated for the carriage wagon making business.—It is in operation in Westfield, Connecticut.

The Morris Canal Company have obtained a loan of 750,000 dollars in Holland for 15 years, at 5 per cent. interest.—It is understood that a much larger sum could have been obtained, if wanted, on similar terms. A writer in a New-York paper asks if this loan could not have been obtained in that city on the same terms? [To this it may be replied, that for some time to come in many of the great enterprizes now in contemplation, loans from abroad will be resorted to, until greater confidence is had in their success; at least, than what appears to exist with certain ones in this section of the country.—ED. JOURNAL.]

Patents.—In the United States about 200 patents are taken out each year; France 180; Austria 180.

The Legislature of Pennsylvania have passed a law to borrow four millions of dollars for internal improvement.

Silk.—It is stated that sewing silk to the amount of $50,000 is manufactured annually in New-Haven, Connecticut, where the mulberry grows in great abundance.

In North America there are 53 species of the oak, 17 of the pine, and 8 of the maple.

In 1680, a Philosophical Society was formed in Boston which held its meetings once a fortnight for *improvement in Philosophy and additions to the stores of Natural History*—It was formed by Dr. Increase Mather, who was in correspondence with the learned Walfadus Senguerdius, one of the Professors at Leyden, and with members of the Royal Society in London. After the elapse of a few years, the calamity of the times caused an interruption, says the historian, to this generous undertaking.

In the legislature of Nova-Scotia Mr. Francis Haward, an American machinist, has petitioned for exclusive privileges, and aid, to introduce labour-saving machines, particularly one for making barrel staves and heading.

AN ECONOMICAL FILTER.

Buy a common earthenware funnel, put a small piece of clean sponge at the top of the pipe inside, and over that a handful of fine gravel; then fill it up with water, and, after passing through, it will come out as clear as crystal. Thus you have quite as good a filterer for domestick purposes for four-pence, as can be purchased for as many pounds.

TO CORRESPONDENTS.

Several articles are necessarily omitted, but shall be attended to in our next.

In the May number we shall give a fine view, in perspective, of Mr. Francis' boat.